

TC

824

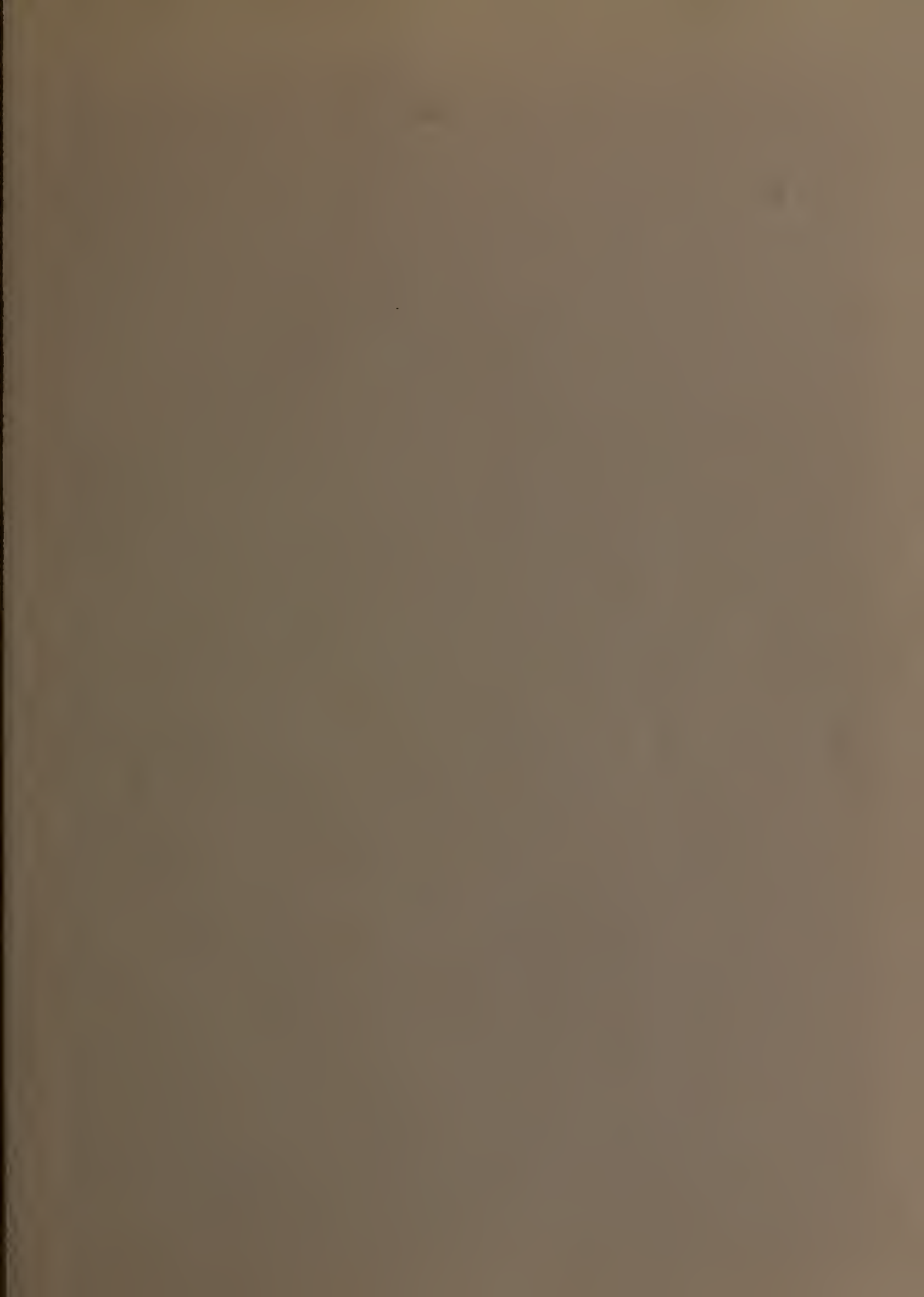
C2

A2

no. 117:

19

LIBRARY
UNIVERSITY OF CALIFORNIA
DAVIS



19



LIBRARY
COPY 2

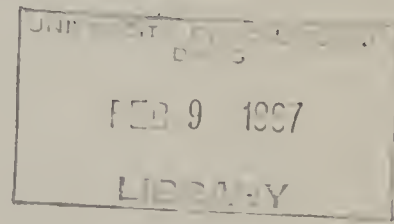
State of California
THE RESOURCES AGENCY

Department of Water Resources

BULLETIN No. 117-19

KETTLEMAN CITY AQUATIC RECREATION AREA

Recreation Development Plan



DECEMBER 1966

HUGO FISHER
Administrator
The Resources Agency

EDMUND G. BROWN
Governor
State of California

WILLIAM E. WARNE
Director
Department of Water Resources

State of California
THE RESOURCES AGENCY
Department of Water Resources

BULLETIN No. 117-19

KETTLEMAN CITY
AQUATIC RECREATION AREA

Recreation Development Plan

DECEMBER 1966

HUGO FISHER
Administrator
The Resources Agency

EDMUND G. BROWN
Governor
State of California

WILLIAM E. WARNE
Director
Department of Water Resources

LIBRARY
UNIVERSITY OF CALIFORNIA
DAVIS

FOREWORD

The Department of Water Resources, under authority contained in the California Water Code, is planning recreation and fish and wildlife enhancement developments associated with state-constructed water projects. This planning is being accomplished in consultation with local public agencies and affected state and federal agencies. This report represents the combined efforts of the Department, the Department of Parks and Recreation, and the Department of Fish and Game. The report presents a development plan for the full realization of the recreation and fish and wildlife enhancement potential at the proposed Kettleman City Aquatic Recreation Area.



William E. Warne, Director
Department of Water Resources
The Resources Agency
State of California
October 17, 1966

TABLE OF CONTENTS

	<u>Page</u>
FOREWORD	iii
ORGANIZATION, DEPARTMENT OF WATER RESOURCES	vii
ABSTRACT	viii
INTRODUCTION AND SUMMARY	1
Purpose	5
Legislative Authorization	5
Recommendations	5
Recreation Costs	6
Evaluation of Recreation Benefits	8

FIGURES

Figure Number

1	Kettleman City Aquatic Recreation Area , Revised Boundary	4
---	--	---

TABLES

Table Number

1	Kettleman City Aquatic Recreation Area, Estimated Capital Costs of Initial Recreation and Fish and Wildlife	7
2	Predicted Visitor Use at Kettleman City Aquatic Recreation Area	8

ADDENDA

A	Comments of Other Agencies
B	Report of Department of Parks and Recreation, "Kettleman City Aquatic Recreation Area, Recreation Development Plan"

State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES

EDMUND G. BROWN, Governor
HUGO FISHER, Administrator, The Resources Agency
WILLIAM E. WARNE, Director, Department of Water Resources
ALFRED R. GOLZE', Chief Engineer
JOHN R. TEERINK, Assistant Chief Engineer, Area Management

SAN JOAQUIN DISTRICT

Carl L. Stetson District Director
Richard W. Meffley Chief, Special Investigations Section

This report was prepared under the direction

of

Victor B. McIntyre Program Manager

by

F. Scott Nevins Associate Engineer, Water Resources
Benjamin D. Kor Assistant Civil Engineer

based on information furnished by
The Contract Service Units, Department of Parks and Recreation
and Department of Fish and Game

ABSTRACT

Kettleman City Aquatic Recreation Area, to be constructed adjacent to the California Aqueduct in Kings County, will provide new recreation and fish and wildlife enhancement facilities for public use on the west side of the San Joaquin Valley. The 398-acre aquatic recreation area will receive development on 137 acres, including two ponds totaling 20 surface acres. The development will create opportunities for camping, picnicking, fishing, swimming, and rowboating. Sanitary facilities, a water supply, and a concession area will also be constructed. Nature trails will traverse the remaining 261-acre wildlife area. Initial facilities at the site are to be completed at an estimated cost of \$2,356 000. The development will ultimately accommodate 596,000 visitor days of use annually.

INTRODUCTION AND SUMMARY

Kettleman City Aquatic Recreation Area is one of four aquatic recreation areas proposed for development adjacent to the California Aqueduct in the San Joaquin Valley. Construction of initial facilities at this recreation area is scheduled for completion by the summer of 1969, contingent upon appropriation of funds by the Legislature.

This report presents a coordinated plan for the development of recreation and fish and wildlife enhancement facilities at the proposed Kettleman City Aquatic Recreation Area. The plan is presented in three distinct parts to preserve the contents of the reports prepared by the participating departments.

Addendum B of this report is an official report prepared by the Department of Parks and Recreation entitled "Kettleman City Aquatic Recreation Area, Recreation Development Plan", dated November 1965. It contains a detailed description of the proposed recreation site and tabulates estimates for recreation demand and visitor use. It presents plans for recreation land use, development, and operation, and includes the Department of Parks and Recreation's recommendations regarding development of the recreation area and an incorporated wayside camping area.

Appendixes A and B were incorporated into Addendum B prior to its transmittal to the Department of Water Resources. Appendix A tabulates the Department of Parks and Recreation's estimated costs of proposed onshore recreation facilities. Appendix B is "A Fish and Wildlife Development Plan for Kettleman City Aquatic Recreation Area" prepared by the Department of Fish and Game. It recommends implementation of the plan presented therein.

This report evaluates the recreation and fish and wildlife benefits that would accrue at Kettleman City Aquatic Recreation Area.

This evaluation is based on visitor use information provided in Addendum B and benefits for a visitor day of use derived by the Department.

Costs are included for the complete development of the recreation area. These costs include land acquisition, road and utility relocations, aqueduct turnout, ponds, conveyance system, onshore recreation facilities, and facilities necessary for fish and wildlife enhancement.

Current concepts for water quality criteria, design, and operation for aquatic features planned for recreation areas along the California Aqueduct in the San Joaquin Valley have been investigated by the Department of Water Resources. The findings resulted in the following recommendations:

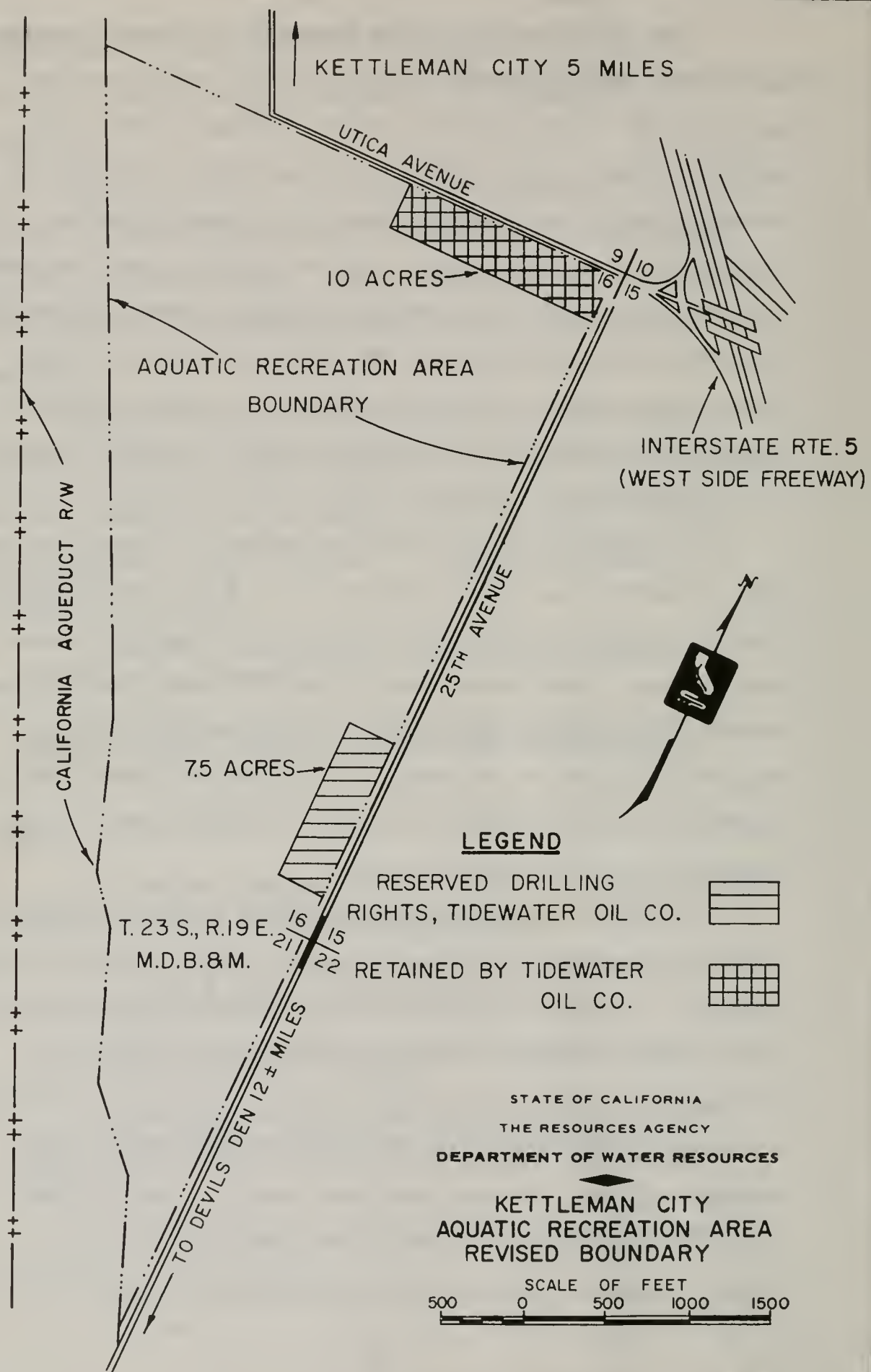
1. Separate ponds should be constructed for swimming at each aquatic recreation area.
2. Aqueduct turnouts should be sized at least large enough to allow a complete change of water in the swimming pond within a 24-hour period.
3. Water should be circulated in the boating and fishing ponds.
4. Chemical treatment of water in the swimming areas should be accomplished if water quality determinations indicate the necessity for the protection of public health.
5. Swimming areas should be lined to provide control of turbidity and undesirable aquatic weed growths.
6. The operating agency should be required to pursue an effective vector control program.
7. Provisions should be made for draining or drawing down swimming ponds and/or boating ponds as required for physical removal of weeds, normal maintenance, and periodic inspection.

The above recommendations should provide safe, healthful, and attractive aquatic facilities.

The area to be acquired for Kettleman City Aquatic Recreation Area has been reduced from 408 to 398 acres. This modification was made subsequent to the publication of the Department of Parks and Recreation's report. Acquisition of a ten-acre parcel located at the northeast corner of the recreation area was not feasible because of its exceedingly high commercial value. This rectangular parcel, now under negotiation, is 1320 feet long and 330 feet wide, adjacent and parallel to the Utica Avenue right-of-way. The deletion of this parcel will require the Department of Parks and Recreation to modify its land use plan and cost estimates for the recreation area. The revised boundary of the recreation area is shown on Figure 1 of this report.

In Addendum B of this report the Department of Parks and Recreation recommends a legislative appropriation of \$1,471,000 for the construction of initial recreation facilities at Kettleman City Aquatic Recreation Area. This amount, however, does not include certain specific recreation costs required initially. An additional \$818,000 will be requested to finance the construction of the pond and turnout, relocation of the county road and utility pole line, and reimbursement of project funds used for the acquisition of land.

The fish and wildlife development plan presented in Appendix B by the Department of Fish and Game recommends a legislative appropriation of \$66,790. The funds would be used to create and maintain a wildlife setting of trees and shrubs and to provide a wildlife water supply. The funds would also be used to stock fish in the large pond, to provide facilities for their propagation, and for the installation of fish-cleaning facilities. Feature number four, page 9, of the Department of Fish and Game's report is a leach line system of introducing the effluent from septic tanks, containing only materials from the fish



cleaning tables, to the 16-acre pond. The incorporation of this feature should be subject to tests indicating that it will effect its intended benefits without creating unforeseen hazards.

Purpose

The purposes of this report are: (1) to present to the State Legislature a plan for development of the recreation and fish and wildlife enhancement facilities at Kettleman City Aquatic Recreation Area, and (2) to provide information supporting budget requests for general fund appropriations to construct the initial recreation facilities.

Legislative Authorization

Legislation to date which includes authorization for recreation development at Kettleman City Aquatic Recreation Area by the State of California is contained in Section 345 of the California Water Code: the Davis-Dolwig Act (Sections 11900-11925 of the California Water Code); Senate Resolution No. 53, 1962, Senate Resolution No. 54, 1963; and Section 5006.3 of the Public Resources Code.

Recommendations

It is recommended that:

1. The recreation development plan for Kettleman City Aquatic Recreation Area as presented by the Department of Parks and Recreation be modified to conform to the recreation area boundary as shown on Figure 1 of this report, and that the modified plan be implemented.

2. The recommendations presented by the Department of Fish and Game for fish and wildlife enhancement at Kettleman City Aquatic Recreation Area be initiated concurrent with the development of recreation facilities.

3. Funds for the design and construction of all initial recreation and fish and wildlife enhancement facilities at Kettleman City Aquatic Recreation Area be requested by appropriate departments through their budgeting procedures.

Recreation Costs

The Davis-Dolwig Act ~~contemplates~~ that recreation facilities be available for use upon completion of a state water project. These initial facilities are those that would be sufficient to accommodate the recreation demand at a project for the first decade of use.

The costs of initial facilities for Kettleman City Aquatic Recreation Area include onshore facilities shown on page 26, Addendum B; capital costs for construction of the ponds, aqueduct turnout, and relocation of approximately one mile of two-lane road, and two and one-half miles of a single-pole utility line; fish and wildlife development costs shown on page 12 of Appendix B of Addendum B; and the cost of acquisition of 398 acres for the proposed recreation area. The total estimated costs of initial facilities at Kettleman City Aquatic Recreation Area are summarized in Table 1 of this report.

The present worth of all costs for the recreation area for the 50-year development period would be approximately \$6,755,000. This amount is based on an interest rate of 3.7 percent, operation and maintenance costs of 30 cents per visitor day of use, and replacement costs of 3.5 percent of annual capital costs excluding overhead.

The Department of Parks and Recreation has undertaken a program for the construction of several wayside parks along the West Side Freeway. A wayside park is a facility located wholly outside the freeway right-of-way with the primary purpose of providing en route camping facilities for the traveling public. A wayside park will be incorporated into Kettleman City Aquatic Recreation Area. It will consist of 160 camping units situated on approximately 40 acres. The cost of the wayside park facilities is included in the total cost for development of the recreation area.

TABLE 1

KETTLEMAN CITY AQUATIC RECREATION AREA

ESTIMATED CAPITAL COSTS OF INITIAL
RECREATION AND FISH AND WILDLIFE FACILITIES

<u>Item</u>	<u>Quantity</u>	<u>Cost</u>
Pond Construction		
Excavation	300,000 c.y.	\$ 120,000
Overhaul	500,000 sta. yds.	3,000
Bentonite	97,000 s.y.	39,000
Gravel and Sand	31,500 c.y.	138,000
Road Relocation	1 mile	90,000
Power Line Relocation	2.5 miles	70,000
Turnout Construction	1.s.	30,000
Conveyance System	1.s.	30,000
	Subtotal	\$ 520,000
	Contingencies 20%	104,000
	Subtotal	\$ 624,000
	Escalation 5%	31,000
	Subtotal	\$ 655,000
	Engineering and Administration 10%	66,000
	Subtotal	\$ 721,000
Land Acquisition Cost Estimated by Department of Water Resources, 398 acres (overhead included)		97,000
	Department Subtotal	\$ 818,000
Capital Costs Estimated by Parks and Recreation (overhead included)		1,471,000
Capital Costs Estimated by Fish and Game (overhead included)		67,000
	Total	\$2,356,000

Negotiations for the relocation of Kings County's two-lane road and Pacific Gas and Electric Company's utility pole line will commence in the near future. The existing county road, which bisects the recreation area, will be relocated along the east boundary of the proposed development. The utility pole line will be relocated along Utica Avenue to 25th Avenue and then south along 25th Avenue to its intersection with the existing line.

For the purpose of this report the size, shape, location, and other criteria recommended by the Department of Parks and Recreation were utilized in estimating the cost of the proposed ponds. The design and location of the ponds will be undertaken by the Department of Water Resources.

Evaluation of Recreation Benefits

The visitor use totals shown in Table 2 below, for Kettleman City Aquatic Recreation Area were taken from page 19, Addendum B of this report. The ultimate facilities proposed for the recreation area would accommodate a maximum of 596,000 visitor days of use annually. This maximum use is predicted to occur in 1998. The 50-year period actually used to compute benefits commenced in 1968. The total present worth of benefits for the recreation area would be approximately \$7,550,000. This amount is based on an interest rate of 3.7 percent and a unit recreation value of one dollar per visitor day of use.

TABLE 2

PREDICTED VISITOR USE AT KETTLEMAN CITY AQUATIC RECREATION AREA

Year	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>2010</u>	<u>2020</u>
Visitor Days (in 1000's)	162	258	418	596	596	596

ADDENDUM A

Comments of Other Agencies

TABLE OF CONTENTS

	<u>Page</u>
DEPARTMENT OF PARKS AND RECREATION	1
DEPARTMENT OF FISH AND GAME	2
DEPARTMENT OF PUBLIC WORKS - DIVISION OF HIGHWAYS	3
BUREAU OF SANITARY ENGINEERING	4
KINGS COUNTY	6

C O P Y

State of California

The Resources Agency

MEMORANDUM

To: Mr. Carl L. Stetson
District Director
San Joaquin District
Department of Water Resources

Date : August 2, 1966

Subject: Review of Draft Report
"Kettleman City Aquatic Recreation Area, Recreation Development Plan"

From: Department of Parks and Recreation

I have reviewed your draft report and have the following comments:

1. The report format is rather difficult to follow. The report is organized into introductory text and two addenda. There is currently no Addendum A. Addendum B, the Department of Parks and Recreation report, includes an Appendix A (cost estimates for initial, second and third decades) and Appendix B (the Fish and Wildlife Plan). The "report" summary which precedes the addenda does not tie all of these parts together into a cohesive report. As a result of the three separate parts of the presentation, there are three Plates 1. I suggest that you attempt to clarify the presentation.
2. On page 2 (next to last paragraph) you mention a reimbursement of \$818,000 to be requested for project funds for certain expenditures. Rather than tie this statement to the capital outlay estimate for recreation, I suggest that you mention that such reimbursement will be under the provisions of Assembly Bill 12.
3. On pages 1 and 2 you list a number of recommendations regarding water quality. I would be interested in reviewing your report which lead to these recommendations.
4. Plate 1 (following page 5) shows certain exclusions in the proposed recreation area. These do not match the exclusions shown on the recreation plan plates. I suggest that you state that your Plate 1 contains the more up-to-date information and that this information was obtained after the completion of the recreation plan (Addendum B).

Thank you for the opportunity to review your proposed bulletin.

/s/ Edward F. Dolder

Edward F. Dolder
Deputy Director - Executive

cc: Mr. W. J. Haussler

C O P Y

State of California

The Resources Agency

MEMORANDUM

To : Mr. Carl L. Stetson, District Director Date: August 10, 1966
Department of Water Resources
San Joaquin District
P. O. Box 2385
Fresno, California

From : Department of Fish and Game - W. T. Shannon, Director

Subject: Draft Report "Kettleman City Aquatic Recreation Area, Recreation Development Plan".

Subject report has been reviewed by my staff. We agree with the contents of the preliminary report.

/s/ W. T. Shannon

Director

C O P Y

State of California

Transportation Agency

MEMORANDUM

To : Department of Water Resources
1416 - 9th Street
Sacramento, California

Attention Mr. Carl L. Stetson

Date: August 1, 1966

File: 06-Kin-5
Kettleman City
Aquatic Recreation
Area

From : Department of Public Works - Division of Highways

Subject: Bulletin No. 117-19

Reference is made to Mr. Carl L. Stetson's letter of July 19, 1966, requesting comments on Bulletin No. 117-19 dated July 1966 for "Kettleman City Aquatic Recreation Area, Recreation Development Plan."

The following comments apply:

Plate No. 1 - page 6 correctly shows 10 acre parcel retained by Tidewater Oil Company. This parcel is shown incorrectly on Plate No. 2 and 3 of addendum B and on Plate No. 1 of appendix B. We have no other comments.

Thank you for the opportunity to review and comment on the report.

J. C. WOMACK
State Highway Engineer

By /s/ D. G. Pengilly

D. G. Pengilly
Planning Engineer

C O P Y

State of California

Department of Public Health

MEMORANDUM

To : Carl L. Stetson, District Director
San Joaquin District
Department of Water Resources
1720 Fulton Street
Fresno, California 93721

Date : July 29, 1966

Subject: Draft Report -
Bulletin 117-19
Kettleman City Aquatic
Recreation Area, Recreation
Development Plan

From: Edmund S. Cary
Bureau of Sanitary Engineering
5545 E. Shields Avenue
Fresno, California

At your request we have reviewed the above plan. The following comments are made to protect the health of the users of the Aquatic area:

1. The plan for treatment of domestic water is not complete. Water taken from the California Aqueduct and served for domestic purposes must be treated by coagulation, sedimentation, filtration and disinfection to provide adequate safety.
2. The sewage disposal systems from the various sanitary facilities in the camp grounds and picnic areas must be kept at least 100 feet from the ponds, preferably down grade from the ponds.
3. The swimming pond must be protected so that no water can flow back from the fishing pond and must have a nominal flow through in 24 hours. Water entering the pond may have to be disinfected to maintain a safe bathing water.
4. Adequate life guarding service must be provided during swimming periods.
5. The swimming pond may have to be lined to hold an adequate swimming area.
6. The Department of Fish and Game's proposed fish cleaning facilities with their discharge for fish cleaning septic tanks to the fourteen acre fishing and boating pond may create esthetic problems such as insect breeding, odors and unsightliness. Provisions should be planned for subsurface leaching fields if such problems occur.

C O P Y

Mr. Carl L. Stetson

-2-

July 29, 1966

Thank you for the chance to review and comment on the above facilities.

H. B. Foster, Jr., Chief
BUREAU OF SANITARY ENGINEERING

/s/ Edmund S. Cary

Edmund S. Cary
Senior Sanitary Engineer
Fresno District

ESC/dk

cc: Kings Co. Health Dept.
BSE - Sacramento
Berkeley

C O P Y

Kings County
BOARD OF SUPERVISORS
Courthouse, Box C
Hanford, California

September 15, 1966

State Department of Water Resources
1720 Fulton Street
Fresno, California

Gentlemen:

The Kings County Board of Supervisors has authorized me to advise the State Department of Water Resources of their action taken regarding the Kettleman City Aquatic Recreation Area, Recreation Development Plan.

It is the opinion of the Board of Supervisors that such a recreational area would greatly benefit the rural areas and citizens of Kings County. With this in mind, the Board of Supervisors fully endorses the development plan submitted on August 23, 1966, of the Kettleman City Aquatic Recreation Area as a State Park.

Sincerely,

/s/ Mel Bloyd
Chairman

gb

ADDENDUM B

Report of the Department of Parks and Recreation,
"Kettleman City Aquatic Recreation Area,
Recreation Development Plan"

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF PARKS AND RECREATION
DIVISION OF BEACHES AND PARKS

KETTLEMAN CITY AQUATIC RECREATION AREA
RECREATION DEVELOPMENT PLAN

by

Otton F. Bauer
Recreation Planner I

Under the Supervision of:

Norman Hongola
Recreation Planner III

and

Henry A. Hjersman
Assistant Supervisor

William J. Haussler
Supervisor

RECREATION CONTRACT SERVICES UNIT

NOVEMBER 1965

T A B L E O F C O N T E N T S

	<u>Page</u>
CHAPTER I. SUMMARY AND RECOMMENDATIONS	1
Summary	1
Recommendations	2
CHAPTER II. INTRODUCTION	3
Legislative Authorization	5
Coordination	7
CHAPTER III. RECREATION AREA	8
Location	8
History and Archaeology	8
Topography and Geology	10
Vegetation	10
Climate	10
Access	11
Economy	12
Fire Hazard	12
Present Recreation Use of the Area	13
Fish and Wildlife	13
CHAPTER IV. RECREATION DEMAND	14
CHAPTER V. RECREATION PLAN	20
Land Use	20
Acquisition	20
Development	22
Pond Design and Construction	23
Pond Operation	24
Initial Recreation Development	24
Future Recreation Development	28
CHAPTER VI. RECREATION OPERATION PLAN	31

TABLE OF CONTENTS (Continued)

TABLES

<u>No.</u>		<u>Page</u>
1	Kettleman City Aquatic Recreation Area Projected Recreation Demand Per Capita Originating at Selected Distances for 1960-2020	15
2	Kettleman City Aquatic Recreation Area Projected Recreation Demand for 1960-2020	16
3	A Comparison Between Recreation Demand and Use Projections at the Kettleman City Aquatic Recreation Area	19
4	Kettleman City Aquatic Recreation Area Land Use	21
5	Kettleman City Aquatic Recreation Area Estimated Capital Costs of Initial Recreation Facilities	26
6	Kettleman City Aquatic Recreation Area Estimated Capital Costs of Recreation Facilities by Decade	30
7	Kettleman City Aquatic Recreation Area Summary of Estimated Recreation Costs by Decade	31

PLATES

<u>No.</u>	
1	Kettleman City Aquatic Recreation Area Location Map
2	Kettleman City Aquatic Recreation Area Land Use and Acquisition Plan
3	Kettleman City Aquatic Recreation Area Developed Area Plan

TABLE OF CONTENTS (Continued)

Page

APPENDIXES
(To Addendum B)

A.	Kettleman City Aquatic Recreation Area Detailed Estimates of Initial, Second and Third Decade Recreation Development Costs	32
B.	A Fish and Wildlife Development Plan for Kettleman City Aquatic Recreation Area	41

CHAPTER I
SUMMARY AND RECOMMENDATIONS

Summary

Water from the California Aqueduct, a key feature of the State Water Resources Development System, will make it possible to provide for recreation needs in the arid southwest San Joaquin Valley, a desert-like region now completely devoid of water-associated recreation facilities. The Kettleman City Aquatic Recreation Area, located five miles south of Kettleman City, California, is one of six recreation sites along the South San Joaquin Division of the aqueduct which will provide the opportunity to meet the need for outdoor water-oriented recreation in this area. Recommended development at the proposed Kettleman City site includes excavation of approximately 20 acres to create two recreation reservoirs and the use of the spoil for landscaping; staged installation of facilities to satisfy recreation demand until the year 1998; and fish and wildlife enhancement proposals.

The Department of Water Resources is authorized and directed by the Legislature to consider recreation as a purpose at state-constructed water projects. Recreation facilities will be available for public use at the Kettleman City Aquatic Recreation Area by the summer of 1969. Water will be available in this section of the California Aqueduct by this time.

Presented in this report are cost estimates for recreation development at the Kettleman City site, a development program, and the recommendations to effect such program.

Recommendations

1. It is recommended that the Legislature appropriate \$1,471,000 for the construction of initial recreation facilities at the Kettleman City Aquatic Recreation Area, and that these funds be made available to the Department of Parks and Recreation through normal budgeting procedures.
2. It is recommended that to satisfy provisions of Senate Bill 581, 1963 Legislative Session, the Department of Water Resources be reimbursed the cost of acquiring lands for wayside camping as needed, up to a maximum of 40 acres, which would be situated within the boundaries of the Kettleman City Aquatic Recreation Area; and, that the funds authorized by Senate Bill 581, codified in Section 5006.3 of the Public Resources Code, be used for this reimbursement.
3. It is recommended that the recommendations set forth by the Department of Fish and Game for fish and wildlife enhancement at the recreation site be initiated concurrent with other recreation development. Fish and wildlife proposals are found in Appendix B of this report.

CHAPTER II

INTRODUCTION

Statewide trends in outdoor recreation clearly indicate the desirability of water-oriented recreation areas in California. Many lakes, streams and reservoirs throughout the State are now often crowded beyond capacity by recreationists seeking enjoyment from, or by, their waters. In recognition of this growing need for aquatic recreation areas, the State Legislature, through the Davis-Dolwig Act of 1961 (Water Code Sections 11900-11925), decreed recreation to be an integral purpose of state water projects. This Act, and others, provide the necessary authorization for planning, development, construction, and operation of recreation areas in conjunction with the State Water Facilities.

The 444-mile California Aqueduct, an important segment of the State Water Plan, will transport surplus water from Northern California to water-deficient Southern California, traversing many arid regions of the State on its way south. Prior reports have indicated the feasibility of utilizing aqueduct water for recreation purposes and have designated several sites that are suitable for recreation development.

A major highway, the West Side Freeway, has been proposed for construction along the west side of the San Joaquin Valley. The route of this highway, a portion of Interstate 5, will approximate that of the California Aqueduct from Alameda County in the north, south to Kern County.

As the freeway and aqueduct will closely parallel each other at several locations a unique opportunity is presented to provide water-based recreation in this section of California. Aquatic recreation areas, being near both the aqueduct and freeway, will not only provide outdoor recreation opportunities for local inhabitants, but also promote highway safety by furnishing the freeway traveler with a place to relax and enjoy a picnic, a swim, or an overnight stop.

The general concept of creating aquatic parks along the California Aqueduct by filling and maintaining excavated recreation ponds with aqueduct water was initiated by a recreation study begun in 1961 by the Department of Water Resources. Subsequent studies refined this general concept and designated several parcels of land along the aqueduct as suitable for creating park areas with recreation ponds as primary attractions. These areas have since been termed Aquatic Recreation Areas and they form an integral part of the coordinated plan for freeway, aqueduct and recreation uses on the west side of the San Joaquin Valley. This report presents a plan for developing one such recreation site--The Kettleman City Aquatic Recreation Area. It contains a description of the recreation site, anticipated visitor use to the area, and estimated capital costs for initial and future development to support this use. Anticipated operation, maintenance, and replacement costs are also included.

This report has been written in partial fulfillment of Interagency Agreement No. 254287 between the Departments of Parks and Recreation and Water Resources.

Legislative Authorization

The passage of the California Water Resources Development System Bond Act in 1959 authorized construction of the State Water Resources Development System. Design and construction of water facilities were made the responsibility of the Department of Water Resources. In this same year, the California Public Outdoor Recreation Plan, Part II, recommended that additional water surface should be found to meet the tremendous demand for aquatic recreation throughout California by planning for the use of the State Water Facilities. The plan states:

"In the continued development of California's water resources, reservoirs and canals should be utilized for recreation to the fullest extent possible."

In 1961, the Davis-Dolwig Act was passed by the California Legislature. This act states that recreation and fish and wildlife enhancement are purposes of the State Water Project. Several sections of the State Water Code authorize and define the responsibilities of state agencies to provide for, plan, develop, operate, and manage recreation facilities and fish and wildlife resources. The following excerpts from the Water Code summarize these responsibilities:

Section 345: "The Department of Water Resources shall (a) plan recreation development associated with state-constructed water projects..."

Section 11910.5: "Such recreational purposes include, but are not limited to, those recreational pursuits generally associated with the out-of-doors, such as camping, picnicking, fishing, hunting, water contact sports, boating and sight-seeing, and the associated facilities of campgrounds, picnic areas, water and sanitary facilities, parking areas, view points, boat launching ramps, and any others necessary to make project land and water areas available for use by the public."

Appropriation for recreation development at state water projects is provided for in Section 11913.

" ... there shall be included in the budget for the Department (of Water Resources) for the 1962-63 fiscal year and each succeeding fiscal year ... an appropriation from the General Fund of the funds necessary for enhancement of fish and wildlife and for recreation in connection with state water projects as provided in this chapter."

Section 11918 designates responsibility for recreation development and operation.

"The Department of Natural Resources (now Parks and Recreation) is authorized to design, construct, operate, and maintain public recreation facilities at state water projects ..."

Further recreation development direction is contained in Section 11900.

" ... that facilities for such purposes (recreation and fish and wildlife enhancement) be ready and available for public use when each state water project having a potential for such uses is completed."

A Department of Water Resources policy states that sufficient recreation facilities be planned to satisfy the predicted visitor demand for the first decade.

Further authorization for recreation planning in conjunction with the West Side Freeway and California Aqueduct was given by Senate Resolutions Nos. 53 in 1962 and 54 in 1963.

Section 5006.3 was added to the Public Resources Code in 1963 by Senate Bill 581. This section states:

"The Department (Parks and Recreation) shall acquire sites for wayside parks and adjacent to the West Side Freeway, State Highway Route 238. The following general vicinities shall be given first consideration:

- (a) Kern River
- (b) South of Kettleman City

- (c) Mercy Springs Road
- (d) Orestimba Creek
- (e) San Joaquin River near Mossdale."

Coordination

This report has been coordinated at the field level with the State Departments of Public Health, Fish and Game, Parks and Recreation, and Water Resources; the State Divisions of Forestry, and Highways; the Kings County Planning Commission; and the Parks and Recreation Department of Kings County.

CHAPTER III

RECREATION AREA

Location

The proposed Kettleman City Aquatic Recreation Area would be located in south central Kings County on the west side of the San Joaquin Valley (Plate 1)*. The nearest town is Kettleman City, California, five miles to the north. The California Aqueduct would form the western border of the area, and the West Side Freeway will pass just east of the site.

History and Archaeology

Tulare Lake, formed in a natural basin by drainage from the Kings and Tule Rivers, was the dominant historical feature of this region. Along the shore of this sometime 400 square-mile lake lived several Yokut Indian tribes. The Indians depended upon the lake and the adjacent rivers, streams and environs to provide them food and shelter. They lived in temporary villages, often constructed of tule mats hung on ridge poles, and followed the shoreline back and forth as the lake level fluctuated. Due to the lake's gentle slope, one foot of vertical change in water level would move the shoreline as much as four miles, and a strong wind would inundate a village site rapidly, forcing the Indians to pick up their houses and flee to higher ground.

The original white settlement of the area near Tulare Lake occurred during the early 1830's. When Kings County was established in 1893, it

* Bound at end of report.

was one of the leading sheep-producing counties in the State. At this time there were 7,325 residents in the county. These early settlers used boats, including steamboats, to ferry passengers and livestock across the lake. On the western shore of the lake a trading post was built in 1870, serving as a landing for the boats and a trading center for the Indians. The site of this old post is three miles south of Kettleman City. Throughout the past, the entire region was greatly influenced by Tulare Lake. Today, upstream flood control projects and diversion of water for irrigation purposes have caused this once vast lake to disappear and much of the old lake bed is now in agricultural production.

In the late 1920's oil was discovered in the nearby Kettleman Hills. The new oil field was to prove one of the richest in the nation. Following this discovery, oil "giants" rushed to the Hills to exploit the new field. Oil towns, such as Avenal and Kettleman City, sprang up and land values spiraled from a few dollars to as much as a million dollars an acre. Kettleman City was named for Dave Kettleman, a stockman in this area during the 1860's, and was established in 1929.

Significant archaeological discoveries have recently been made during construction of State Water Project facilities. Excavation at the San Luis Dam site uncovered faunal remains of the Pleistocene Period and prehistoric Indian artifacts. However, initial surveys of the Kettleman City Aquatic Recreation Area site reveal no evidence of archaeological importance.

Topography and Geology

The Kettleman Hills rise to an elevation of more than 1,000 feet above sea level just west of the recreation site. The average elevation of the site is 300 feet above sea level, and the land slopes to the northeast at a grade of approximately two percent. The original shoreline of the now dry Tulare Lake lies a mile north of the site at an elevation of 198 feet.

The recreation site is situated on an alluvial fan formed by the ephemeral La Salida and El Portillo Creeks which emerge from the Kettleman Hills. The soil has a light density, an open structure, and is composed of sediments derived from the San Joaquin and Tulare geologic formations. These sediments consist of silty sand, silt, sandstone, clay and gravel, and have a fairly high salt content.

Vegetation

Vegetative cover in this region is predominantly allscale (Atriplex polycarpa), a desert-type shrub, and annual grasses and herbs. There is a marked absence of trees. Atriplex at the recreation site is sparse and browsed heavily by sheep and rabbits. This shrub, when allowed to grow undisturbed, provides good food and shelter for many small birds, especially quail, and several small mammals.

Climate

The climate of Kings County is semiarid with hot, dry summers and mild, foggy winters. The recreation site, however, will often remain free of the low-lying winter fogs which frequently cover the valley floor.

Unbroken sunshine in spring, summer, and fall is typical of the region

and will enhance the attractiveness of the aquatic park for recreation use.

Climatological data from two nearby weather stations show average rainfall in the recreation area to be between five and seven inches annually. Snowfall rarely occurs. Temperatures range from a mean minimum of 37° in January to a mean maximum of 99° in July. The prevailing winds are from the northwest, and are generally of a light velocity.

Access

The West Side Freeway, two good county roads, and State Highway 41 will provide easy access to the proposed recreation area. The West Side Freeway, which will become a major link between Los Angeles and the Bay Area, will pass just east of the site and provide direct access via an interchange at the area's northeastern tip. Average daily traffic passing the recreation area on the freeway is predicted by the California Division of Highways to be 13,790 vehicles in 1975 and 24,280 in 1990. As the recreation area is approximately midway between greater Los Angeles and the Bay Area, numerous highway travelers are expected to break the monotony of their long trip by stopping to enjoy the facilities provided at the recreation area.

Access to the site from the Central San Joaquin Valley will be via State Highway 41, then south on 25th Avenue. Good access from the east is also available via Utica Avenue, and Kings County has proposed an extension of this road to State Highway 41 which would then provide direct access from the west.

Economy

Since the first settlers came to Kings County, its economy has been basically agricultural. In 1964, an income of almost \$126,000,000 was realized in the county from field and truck crops, dairy products, livestock, and poultry. The processing of agricultural commodities forms a substantial part of the county's expanding industry. Since the discovery of oil in 1928, the production and refining of oil and gas has added many millions of dollars annually to the county's economy.

During World War II a flight training center was located near the town of Lemoore. In 1961 the Lemoore Naval Air Station was commissioned. With a complement of nearly 12,000 employees and dependents, this air base now bolsters the county's economy by approximately \$30,000,000 each year.

The economy of the Kettleman City area is based chiefly on the petroleum industry, livestock grazing, and field crop production.

Fire Hazard

Dry ground cover, high temperatures, and low humidities during the summer will create a high fire hazard at the recreation site. Development of the site for recreation, with the accompanying public use, will create an even higher risk. Two year-round fire stations are operated by the county within 18 miles of the recreation site. One is five miles north at Kettleman City and the other is at Avenal, 18 miles west. The State Division of Forestry maintains a fire control station 21 miles away on State Highway 41 during fire season only.

The operating unit at the aquatic recreation area should have a fire plan and maintain fire suppression equipment at the site for initial attack and to supplement outside fire control units. The State Division of Forestry has recommended a fire break around the perimeter of the site for additional protection.

Present Recreation Use of the Area

Small game hunting, rock hounding, and fossil hunting are infrequent present recreation uses of the area. Limited use is made of nearby irrigation ponds and canals for swimming and fishing. A small county park is located in Kettleman City which contains a ball field, swimming pool, turfed picnic area, and community recreation building.

Fish and Wildlife

There are no fish present due to the lack of water. Wildlife populations are low and the species found on and near the proposed recreation area are listed in Appendix B, "A Fish and Wildlife Development Plan for Kettleman City Aquatic Recreation Area", which was prepared by the Department of Fish and Game.

CHAPTER IV

RECREATION DEMAND

Anticipated recreation use at the Kettleman City Aquatic Recreation Area was computed by use of the "Comparable Reservoir Method". This method is based on a comparison of recreation use at a known reservoir with the reservoir under study. Characteristics which must be weighed in order to determine the degree of similarity include: size of reservoir, competition with other recreational units, topography, accessibility, weather and surrounding population.

No single recreation area was found to be directly comparable to the proposed Kettleman City area. Therefore, a comparable model was synthesized from data on recreation use at Ming Lake in Kern County and Lake Yosemite in Merced County. The area around each of these two reservoirs was divided into concentric zones of equal travel distance. Determination of the population of each zone and the amount of recreation use originating in each zone allowed calculation of per capita use rates by zones. This information was used to develop a regression curve indicating the rate of per capita use versus distance relationship. This regression curve was calculated for both of the known reservoirs and was then adjusted between the values obtained for the two reservoirs. The per capita use rate of the blended curve was applied to the population of similar concentric zones for the proposed recreation site (Table 1).

T A B L E 1

KENTLEMAN CITY AQUATIC RECREATION AREA PROJECTED RECREATION DEMAND PER CAPITA ORIGINATING AT SELECTED DISTANCES FOR 1960-2020

Mileage Zone	Increment Per Decade	Year									
		1960	1970	1980	1990	2000	2010	2020			
0-10	.81	3.015	3.825	4.635	5.445	6.255	7.065	7.875			
11-20	.30	1.165	1.465	1.765	2.065	2.365	2.665	2.965			
21-30	.115	.45	.565	.68	.795	.91	1.025	1.14			
31-40	.0375	.145	.183	.22	.258	.295	.333	.37			
41-50	.014	.055	.069	.083	.097	.111	.125	.139			
51-60	.0065	.025	.032	.038	.045	.051	.058	.064			
61-70	.003	.0125	.0155	.0185	.0215	.0245	.0275	.0305			
71 +	.00039	.0015	.00189	.00228	.00267	.00306	.00345	.00384			

T A B L E 2

KETTLEMAN CITY AQUATIC RECREATION AREA
PROJECTED RECREATION DEMAND
FOR 1960-2020

	1960			1970			1980		
Mileage : Zone :	P/C :	Population :	Demand :	P/C :	Population :	Demand :	P/C :	Population :	Demand :
0-10	3.015	3,396	10,200	3.825	4,998	19,100	4.635	6,533	30,300
11-20	1.165	6,542	7,600	1.465	9,623	14,100	1.765	12,553	22,200
21-30	.45	45,479	20,500	.565	62,508	35,300	.68	82,707	56,200
31-40	.145	79,807	11,600	.183	101,754	18,600	.22	134,403	29,600
41-50	.055	161,739	8,900	.069	197,494	13,600	.083	260,579	21,600
51-60	.025	510,530	12,800	.032	658,161	21,100	.038	919,757	35,000
61-70	.0125	101,238	1,300	.0155	131,900	2,000	.0185	183,711	3,400
71 +	.00150	14,921,269	22,400	.00189	20,421,000	38,600	.00228	26,551,000	60,500
	TOTAL DEMAND		95,300	TOTAL DEMAND		162,400	TOTAL DEMAND		258,800

T A B L E 2 (Continued)

KETTLEMAN CITY AQUATIC RECREATION AREA
PROJECTED RECREATION DEMAND
FOR 1960-2020

	1990			2000			2010		
Mileage :	:	:	:	:	:	:	:	:	:
Zone :	P/C :	Population :	Demand :	P/C :	Population :	Demand :	P/C :	Population :	Demand :
0-10	5.445	8,342	45,400	6.255	11,517	72,000	7.065	16,497	116,600
11-20	2.065	16,033	33,100	2.365	22,148	52,400	2.665	31,693	84,500
21-30	.795	116,078	92,300	.91	158,327	144,100	1.025	217,426	222,900
31-40	.258	192,502	49,700	.295	272,301	80,300	.333	373,335	124,300
41-50	.097	412,449	40,000	.111	572,182	63,500	.125	773,095	96,600
51-60	.045	1,424,238	64,100	.051	1,904,424	97,100	.058	2,441,037	141,600
61-70	.0215	270,659	5,800	.0245	406,640	10,000	.0275	581,670	16,000
71 +	.00267	32,901,000	87,800	.00306	39,681,000	121,400	.00345	46,311,000	159,800
	TOTAL DEMAND	418,200		TOTAL DEMAND	640,800		TOTAL DEMAND	962,300	

T A B L E 2 (Continued)

KETTLEMAN CITY AQUATIC RECREATION AREA
PROJECTED RECREATION DEMAND
FOR 1960-2020

		2020	
Mileage	:	:	:
Zone	P/C	Population	Demand
0-10	7.875	24,617	193,900
11-20	2.965	47,333	140,300
21-30	1.14	302,561	344,900
31-40	.37	496,805	183,800
41-50	.139	995,789	138,400
51-60	.064	3,020,504	193,300
61-70	.0305	767,532	23,400
71 +	.00384	52,941,000	203,300
TOTAL DEMAND			1,421,300

The initial recreation use for the proposed Kettleman City site was computed by ten-mile travel zones for a distance of seventy miles. An eighth zone was used for the remaining population of the State (Table 2). Heavy visitor-use is not expected to occur until the completion of the West Side Freeway in 1972 and until the growth of planted trees and shrubs creates more attractive surroundings. The projected demand for recreation and the predicted recreation use at Kettleman City Aquatic Recreation Area, in terms of thousands of visitor days per year at ten-year intervals, is presented below in Table 3.

T A B L E 3

A COMPARISON BETWEEN RECREATION DEMAND AND USE PROJECTIONS
AT THE KETTLEMAN CITY AQUATIC RECREATION AREA
(In Thousands)

<u>Visitor Days</u>	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>Year</u> <u>2000</u>	<u>2010</u>	<u>2020</u>
Demand	162	258	418	640	962	1421
Use	162	258	418	596	596	596

The carrying capacity of the area, or the amount of use that the land can support over a long period without damage to the resource, is expected to be reached in 1998 at 596,000 visitor days per year.

CHAPTER V
RECREATION PLAN

Land Use

The proposed Kettleman City Aquatic Recreation Area, and the surrounding territory, are now wastelands. The 408 acres comprising the recreation site would be transformed into an attractive aquatic park by using water from the California Aqueduct to fill the man-made ponds, and to irrigate the planted trees, shrubs and lawns. The types of recreation uses that have been planned for the area are defined in Section 11910.5 of the Water Code and include camping, picnicking, fishing, boating, water-contact sports, sight-seeing, and other pursuits usually associated with the out-of-doors. At present, no power boating or hunting is planned due to insufficient space. Plate 3* shows initial and future land uses at the Kettleman City Aquatic Recreation Area, and Table 4 presents land acreages devoted to each use.

Acquisition

Acquisition recommendations were presented in an emergency recreation land use and acquisition plan by the Department of Water Resources in 1963. This report recommended 325 acres for acquisition. Subsequent reports delineated 408 acres in private ownership to be acquired. Of these 408 acres, 137 acres are proposed for aquatic recreation and camping development, and 256 acres for wildlife enhancement. These lands are being acquired by the Department of Water Resources under Davis-Dolwig Act directives and title will be retained by the State. Acquisition boundary lines are shown on Plate 2*.

* Bound at end of report.

T A B L E 4

KETTLEMAN CITY AQUATIC RECREATION AREA

LAND USE

Land Use	Acres
Family Camping	60
Group Camping	5
Family Picnicking	20
Group Picnicking	5
Beach	3
Ponds	20
Concession Area	1
Administration	5
Parking	5
Turf other than in Picnic Area	<u>13</u>
	137
Reserved drilling sites Tidewater Oil Company	<u>15</u>
	152
Wildlife Area	<u>256</u>
Total Acreage	408

A distinction was made between the recreation area boundary and the recreation zone boundary as this portion of the aqueduct will be open to the public for fishing and can thus be considered within the overall recreation zone. Tidewater Oil Company has proposed to retain oil drilling rights on two 7-1/2 acre parcels within the recreation area. The natural vegetation will remain on these lands until such drilling occurs.

Development

There are several advantages of an area constructed solely for recreation over one constructed for multi-purpose uses. Factors affecting recreation use such as water depths, pond slopes, and arrangement of facilities can be determined solely on the basis of their effect on recreation use.

Recommended development at the proposed Kettleman City Aquatic Recreation Area will be comprised of two ponds, one for swimming and one for boating and fishing; picnicking, camping, and fishing facilities; concession and administration areas; and more than 250 acres are designated for wildlife enhancement and nature study. Access to the California Aqueduct for fishing will be provided and, in the future, if there is riding, hiking or bicycling along the Aqueduct, ample room has been planned for a staging area at the site.

Prior to construction of the recreation ponds and installation of facilities, a single pole power line and a two-lane county road must be relocated. The county road, which now passes through the northeast portion of the recreation area, would be relocated to the east perimeter; and, in order to enhance the area's esthetic value, the power line should be relocated adjacent to the new road. Approximately one mile of road and

2-1/2 miles of power line would be involved in these relocations. Kings County has indicated a cost sharing agreement between the county and the Department of Water Resources might be arranged pertaining to the county road.

Pond Design and Construction

To achieve maximum recreation benefits and to support anticipated visitor use, the following criteria should be used by the Department of Water Resources in the design and construction of the recreation ponds:

1. Two ponds, shaped as in Plate 3*, are needed. Separation of the ponds will facilitate the maintenance of water quality and water circulation patterns necessary for full recreation utilization and prevent conflicts between swimmers, boaters and fisherman.

2. The boating and fishing pond, comprising 16 surface acres at an elevation of 284 feet, will hold about 140 acre-feet of water when full. It has been planned to produce maximum fish populations, create a greater feeling of open space to boaters, and present a picturesque appearance to picnickers and campers.

The bottom of the boating and fishing pond should slope at a 2:1 grade from the shoreline to a depth of three feet, and then at an approximate ten percent slope to a depth of ten feet or more. Twenty-five percent of the pond area, about four acres, should be at least ten feet deep. The sharp drop-off at the shoreline is necessary to help control the growth of rooted aquatic vegetation.

3. The swimming pond, approximately four surface acres and 18 acre-feet of water, should provide a shallow children's wading area, one to three feet deep and one acre in size, at the northeast tip and then slope

* Bound at end of report.

westerly to an eight-foot maximum depth using an eight percent bottom slope and ten percent side slopes. Approximately three acres on the south and east shores of the pond would have to be gently sloped to an approximate ten percent grade for beach use.

4. Spoil from pond excavation should be distributed around the ponds and camping areas approximately as shown by the contour lines on Plate 3*.

5. A turnout should be provided in the California Aqueduct for initial filling and subsequent maintenance of the ponds, and for irrigation and domestic use within the recreation area.

Pond Operation

1. Water exchange in the boating and fishing pond should be kept at a minimum, and the water level stable, to create suitable fishery conditions. Water exchange should occur only when irrigation water is needed.

2. The swimming pond should have an adequate turnover of water, and may have to be treated to insure a healthful and desirable swimming area.

Initial Recreation Development

Initial recreation development is defined in this report as that which should occur between 1968 and 1977. The estimated capital costs of recreation facilities needed to accommodate predicted annual recreation use during this first decade are presented in summarized form in Table 5, and in more detail in Appendix A-1. Camp and picnic unit costs include site preparation and a table for each unit, one stove per camp unit, and one stove for every two picnic units.

Initial recreation developments were sized in accordance with the Department of Parks and Recreations' Procedures Memorandum #6--Design Load Criteria

* Bound at end of report.

and Procedures. This memorandum establishes procedures for determining design loads to a unit of the State Water Project for any given period of time. The recreation planning criteria used in conjunction with procedures set forth in Memorandum #6 was based on studies of recreation use at Millerton and Yosemite Lakes. The number of camping and picnicking units per acre and associated development was based on standards presented in the Recreation Planning Manual of the Department of Parks and Recreation and current standards of this departments' Reservoir Development Section.

Initial capital outlay for fish and wildlife development is presented by the Department of Fish and Game in Appendix B of this report.

Fifty camp and 50 picnic units would be installed to meet anticipated visitor use between 1968, the first year of construction, and 1977. Twenty-five picnic units, 25 camp units, and the swimming beach are proposed for development in fiscal year 1967-68; 25 picnic units in 1970-71; and 25 camp units in 1971-72. Appropriate installation of utilities, parking areas, administration buildings, sanitary facilities, turf and trees has been planned to accompany the foregoing development of recreation facilities.

All tree plantings will be made within the first five years but would provide little shade until the second decade. It will be necessary, then, to furnish each of the 50 picnic and 50 camp units with a ramada. The camping area planned for initial development (Plate 3)* is deemed the most desirable as this location is near the recreation pond, and will receive less disturbance from construction of, and subsequent traffic noise from, the West Side Freeway. Initial day-use facilities will have convenient access to both

* Bound at end of report.

T A B L E 5

KETTLEMAN CITY AQUATIC RECREATION AREA
ESTIMATED CAPITAL COSTS OF INITIAL
RECREATION FACILITIES

Facilities	(in thousands of dollars - rounded)		Cost
	Units		
Picnic Sites	50 + Ramadas		\$ 24
Camp Sites	50 + Ramadas		25
Beach	1 acre sand, 3 acres sand and base rock mix		47
Parking	300 spaces		50
Landscaping	128 acres		118
Utilities	Power and water		479
Roads	4.5 acres		58
Sanitary	Rest rooms, sewage disposal		114
Administration	Buildings, residences		99
Fencing	Boundary		37
Signs	LS		<u>10</u>
Subtotal			\$1,061
Contingencies 10%			<u>106</u>
			\$1,167
Escalation 5%			<u>59</u>
			\$1,226
Architectural & Engineering 20%			<u>245</u>
TOTAL INITIAL DEVELOPMENT			\$1,471

ponds, the beach, and the concession area. Ten acres of turf and tree plantings are planned for this day-use area.

The fishing and boating pond would accommodate up to 30 boats at one time, providing intensive fishing and boating opportunities. All power boating should be prohibited because of the small pond size. Boat rentals, bait and tackle would be supplied by a concessionaire. A small walkway ramp to the water's edge would be available for cartop boat launching. No boat-trailer launching ramp is planned but car-trailer parking will be available at the concession area.

A foot trail to the California Aqueduct for fishing access would be provided through a cut in the aqueduct's spoil-bank, but no nearby parking area would be furnished until fish populations become established in the aqueduct.

During beach construction, one acre, 12 inches deep, of sand should be placed above the shoreline and three acres of mixed sand and base rock placed below the shoreline before the swimming pond is filled. The sand-base rock mix will create more desirable bottom conditions for swimmers. If final geological reports indicate that it is necessary to seal the bottom of the swimming pond to prevent seepage, installation or construction of an impervious lining would precede placement of the sand-base rock mix. Two of the three acres sloped for beach use would later be planted with grass. A recirculating pump would take water from the deeper portion of the pond and distribute it in a spray for aeration and children's enjoyment at the shallow wading area.

The urgency of establishing vegetation at this barren site necessitates installation of the entire system for tree irrigation by 1972. Wharf hydrants would be connected to this system for fire protection. Other utilities, sanitary facilities, roads and parking have been calculated to accommodate annual visitation. Power distribution would be placed underground. Domestic water supply would be completely separate from irrigation supply since irrigation water will be pumped directly from the ponds while domestic water would be taken directly from the aqueduct to a treatment plant. As water temperatures are expected to reach about 80° F., a cooling tower for domestic water would be provided in connection with an elevated redwood storage tank. Sewage disposal would be by septic tank and individual leach fields. A sewage disposal station for trailers is also included in the initial facilities.

Fish cleaning facilities to meet basic health requirements would be installed close to the concession area and at the fishing access site near the aqueduct. The Department of Fish and Game has proposed more elaborate fish cleaning facilities to provide for both sanitation and enrichment of the water for fisheries enhancement in the boating and fishing pond. Their proposals are discussed in Appendix B.

Administrative area development would include two residences, a park office, kiosk, utility building and employee trailer pads.

Future Recreation Development

As additional visitor demand dictates, recreation facilities will be developed until area capacity is reached. This capacity has been predicted to occur about 1998, with facilities at this time providing enjoyment to

people representing an estimated 596,000 visitor-days annually. Future recreation development costs are shown in Table 6 and more detailed cost estimates are presented in Appendices A-2 and A-3. Plate 3^{*} shows areas of future development.

Ultimate proposed development would be accomplished in the third decade and the area development then would total 240 camp units, 200 picnic units, areas for group picnicking and camping, and three acres of beach. Forty acres of turf within the picnicking area would provide additional picnic space.

The northwest corner of the recreation site, designated as a wildlife area, could be used as a staging area for horseback riders, hikers or bicycling groups if a riding and hiking trail is constructed along the California Aqueduct.

* Bound at end of report.

T A B L E 6

KETTLEMAN CITY AQUATIC RECREATION AREA
ESTIMATED CAPITAL COSTS OF RECREATION FACILITIES BY DECADE
(in thousands of dollars)

Facility	Units per Decade			Cost per Decade		
	1	2	3	1	2	3
	: 1968-1977	: 1978-1987	: 1988-1997	: 1968-1977	: 1978-1987	: 1988-1997
Picnic Sites	50	50	100	24	12	23
Group Picnic	-	-	2	-	-	6
Camp Sites	50	80	110	25	20	27
Group Camp	-	1	-	-	6	-
Beach - Acres, Land	1	2(turf)	-	15	5	-
Beach - Acres, Water	3	-	-	32	-	-
Landscaping - Acres	128	-	-	92	-	-
Turf Planting - Acres	10	18	10	26	47	26
Utilities - Power & Water	-	-	-	479	87	60
Roads - Acres	4.5	4.8	9.7	58	70	151
Parking - Spaces	300	150	250	50	21	35
Sanitary Facilities	6	6	5	114	98	70
Administration Area	11	-	-	99	-	-
Fencing	Boundary	-	-	37	-	-
Signs	-	-	-	10	10	5
Subtotals				1,061	376	403
Overhead				410	170	208
Decade Total				\$1,471	\$ 546	\$ 611
GRAND TOTAL				<u>\$2,628</u>		

CHAPTER VI

RECREATION OPERATION PLAN

The Department of Parks and Recreation, Division of Beaches and Parks, would be required to operate and maintain the Kettleman City Aquatic Recreation Area if no local public agency is willing to contract for this obligation. The pond fishery and the wildlife area would be maintained by the operating agency under a plan formulated jointly with the Department of Fish and Game.

A private concessionaire would be contracted with to provide necessary services. These services should include not only boating and fishing supplies, but also groceries, snacks and laundry facilities.

Operation, maintenance and replacement costs are shown by decade in Table 7. Operation and maintenance costs are computed at 30 cents per visitor day, and replacement costs at 3.5 percent of capital costs per year, excluding overhead.

T A B L E 7

KETTLEMAN CITY AQUATIC RECREATION AREA
SUMMARY OF ESTIMATED RECREATION COSTS
(By Decade)

	:	:	Capital	:	Operation &	:	Replacement	:	Visitor
	:	:	Outlay	:	Maintenance	:		:	Days of Use ¹
Decade	:	Year	:	(in thousands)					
1		1968-1977	\$1,471		\$ 562		\$371		1,874
2		1978-1987	546		902		502		3,005
3		1988-1997	611		1,427		643		4,757
4		1998-2007	---		1,788		643		5,960
5		2008-2017	---		1,788		643		5,960

¹ 1998 - area capacity reached at 596,000 visitor days per year

A P P E N D I X A

Kettleman City Aquatic Recreation Area
Detailed Estimates of Initial, Second and
Third Decade Recreation Development Costs

A P P E N D I X A - 1

KETTLEMAN CITY AQUATIC RECREATION AREA FACILITIES AND ESTIMATED CAPITAL COSTS OF INITIAL RECREATION DEVELOPMENT

Facility	:	Unit	:	Cost
<u>Beach Development</u>				
Sand		6,200 Tons at \$5/Ton	\$	31,000
Base Rock		3,200 Tons at \$5/Ton		<u>16,000</u>
			\$	47,000
<u>Utility - Water, Irrigation</u>				
Standpipe Top	LS ^{1/}		\$	1,000
12" Plain Conc. Pipe	2,000 LF at \$4/LF			8,000
12" Slide Gates	2 ea. at \$500			1,000
8" AC Pipe	107 LF at \$7.50/LF			800
Intake System - complete	2 ea. at \$10,000			20,000
Pumps - complete	4 ea. at \$3,000			12,000
8" AC Pipe	7,600 LF at \$7.50/LF			57,000
8" Gate Valve w/box	12 ea. at \$300			4,000
6" AC Pipe	15,100 LF at \$5/LF			75,500
6" Gate Valve w/box	25 ea. at \$200			5,000
AC Pipe - 4", 3" & 2½"	20,900 LF at \$3.50/LF			73,300
Gate Valves - 4", 3" & 2½"	20 ea. at \$100			2,000
Pipe, Galv. Iron, 2" and smaller	1,000 LF at \$2/LF			2,000
Quick Coupler Valves	120 ea. at \$20			2,400
Sprinkler Heads (100' dia.)	120 ea. at \$50			6,000
Turf and Lawn Irrigation System, including controls	10 acres at \$3,000/acre			<u>30,000</u>
			\$	300,000

1/ Lump Sum

Facility	Unit	Cost
<u>Utility - Water, Domestic</u>		
Treatment Plant - complete, 400 GPM	LS	\$ 60,000
Housing for Treatment Plant	LS	5,000
Booster Pump - complete	LS	3,000
Combination Cooling Tower and Tank	One 15,000 gal. at \$8,000	8,000
8" AC Pipe	1,000 LF at \$7.50/LF	7,500
8" Gate Valves	2 ea. at \$300	600
6" AC Pipe	9,300 LF at \$5/LF	46,500
6" Gate Valves	5 ea. at \$200	1,000
AC Pipe 4", 3" & 2½"	1,000 LF at \$3.50/LF	3,500
Galv. Iron Pipe 2" and smaller	500 LF at \$2/LF	1,000
Wharf Hydrants	20 ea. at \$150	3,000
Hose Bibbs	20 ea. at \$50	1,000
		<u>\$ 140,100</u>

Utility - Electric

High Voltage Line - Underground	2,400 LF at \$5/LF	\$ 12,000
Transformer Pad and Housing	2 ea. at \$1,500	3,000
Low Voltage Line - Underground	4,000 LF at \$3/LF	12,000
Manhole and Vault	1 ea. at \$500	500
Pull Boxes	40 ea. at \$35	1,400
Transformer, Dry type	4 ea. at \$300	1,200
Area Lighting	LS	5,000
Misc. Controllers and Safety Switches	LS	<u>2,500</u>
		<u>\$ 37,600</u>

Roads - All

Clear and Grub	4.5 Acres at \$1,000	\$ 4,500
Grade and Shape	8,160 CY at \$1.25/CY	10,200
Aggregate Base	4,400 Tons at \$5/Ton	22,000
AC Paving	1,200 Tons at \$15/Ton	18,000
Drainage Items	LS	<u>3,000</u>
		<u>\$ 57,700</u>

Facility	:	Unit	:	Cost
----------	---	------	---	------

Parking

Clear and Grub	2.6 Acres at \$1,000/Ac.	\$ 2,600
Grade and Shape	8,366 CY at \$1.25/CY	10,457
Aggregate Base	3,572 Tons at \$5/Ton	17,860
AC Paving	1,269 Tons at \$15/Ton	<u>19,035</u>
		\$ 49,952

Landscaping

Grading and Relief (Finishing)	LS	\$ 10,000
Turf Development	435,600 SF at \$0.06/SF	26,160
Tree Planting	8,160 ea. at \$10	<u>81,600</u>
		\$ 117,760

Camping and Picnicking

Camp Units	50 ea. at \$250	\$ 12,500
Picnic Units	50 ea. at \$225	11,250
Ramadas	100 ea. at \$250	<u>25,000</u>
		\$ 48,750

Sanitary Facilities

Comfort Station #300	1 ea. at \$12,500	\$ 12,500
Combination Building #300	1 ea. at \$19,000	19,000
Comfort Station and Dressing Room #6000	2 ea. at \$40,000	80,000
Fish Cleaning Facilities	2 ea. at \$1,000	<u>2,000</u>
		\$ 113,500

Administration Buildings and Residences

Park Office including First Aid Station - Large	1 ea. at \$27,000	\$ 27,000
Kiosk - Type A	1 ea. at \$5,000	5,000
Utility Building	1 ea. at \$16,000	16,000
Park Residences - C Type	2 ea. at \$24,000	48,000
Trailer Pads	6 ea. at \$500	<u>3,000</u>
		\$ 99,000

Facility	Unit	Cost
<u>Lifeguard and Safety Equipment</u>		
Lifeguard Stands	4 ea. at \$250	\$ 1,000
Floats, Buoys, Etc.	LS	<u>2,000</u>
		\$ 3,000
<u>Fencing</u>	18,400 LF at \$2/LF	\$ 36,800
<u>Signs</u>	LS	\$ 10,000
	Subtotal	\$1,061,162
	Contingencies 10%	<u>106,116</u>
		\$1,167,278
	Escalation 5%	<u>58,363</u>
		\$1,225,641
	Architectural and Engineering 20%	<u>245,128</u>
	TOTAL INITIAL DEVELOPMENT	\$1,470,769

A P P E N D I X A - 2

KETTLEMAN CITY AQUATIC RECREATION AREA FACILITIES AND ESTIMATED CAPITAL COSTS SECOND DECADE RECREATION DEVELOPMENT

Facility	Unit	Cost
<u>Utility - Water, Irrigation</u>		
Turf and Lawn Irrigation System Including Controls	20 Acres at \$3,000/Acre	\$ 60,000
<u>Utility - Water, Domestic</u>		
AC Pipe, 4", 3" & 2-1/2"	1,000 LF at \$3.50/LF	\$ 3,500
Galv. Iron Pipe, 2" & smaller	300 LF at \$2/LF	600
Hose Bibbs	15 ea. at \$50	750
		<u>\$ 4,850</u>
<u>Utility - Electric</u>		
Low Voltage Line - Underground	5,000 LF at \$3/LF	\$ 15,000
Pull Boxes	40 ea. at \$35	1,400
Transformers - Dry Type	5 ea. at \$300	1,500
Area Lighting	LS	2,500
Misc. Controllers and Safety Switches	LS	<u>1,250</u>
		<u>\$ 21,650</u>
<u>Roads - All</u>		
Clear and Grub	4.8 Acres at \$1,000/Acre	\$ 4,800
Grade and Shape	10,400 CY at \$1.25/CY	13,000
Aggregate Base	5,200 Tons at \$5/Ton	26,000
AC Paving	1,533 Tons at \$15/Ton	23,000
Drainage Items	LS	<u>3,200</u>
		<u>\$ 70,000</u>

Facility	Unit	Cost
<u>Parking</u>		
Clear and Grub	1.1 Acres at \$1,000/Acre	\$ 1,100
Grade and Shape	3,560 CY at \$1.25/CY	4,450
Aggregate Base	1,520 Tons at \$5/Ton	7,600
AC Paving	540 Tons at \$15/Ton	8,100
		<u>\$ 21,250</u>
<u>Landscaping</u>		
Turf Development	871,200 SF at \$0.06/SF	\$ 52,320
<u>Camping and Picnicking</u>		
Camp Units	80 ea. at \$250	\$ 20,000
Picnic Units	50 ea. at \$225	11,250
Group Camp	100 persons at \$60/person	6,000
		<u>\$ 37,250</u>
<u>Sanitary Facilities</u>		
Comfort Station #200	1 ea. at \$10,000	\$ 10,000
Comfort Station #300	1 ea. at \$12,500	12,500
Combination Building #300	3 ea at \$19,000	57,000
Comfort Station and Dressing Room #4000	1 ea. at \$19,000	19,000
		<u>\$ 98,500</u>
<u>Signs</u>	LS	\$ 10,000
	Subtotal	\$ 375,820
	Contingencies 10%	<u>37,582</u>
		\$ 413,402
	Escalation 10%	<u>41,340</u>
		\$ 454,742
	Architectural and Engineering 20%	<u>90,948</u>
	TOTAL SECOND DECADE DEVELOPMENT	\$ 545,690

A P P E N D I X A - 3

KETTLEMAN CITY AQUATIC RECREATION AREA FACILITIES AND ESTIMATED CAPITAL COSTS THIRD AND FINAL DECADE RECREATION DEVELOPMENT

Facility	Unit	Cost
<u>Utility - Water, Irrigation</u>		
Turf and Lawn Irrigation System Including Controls	10 Acres at \$3,000/Acre	\$ 30,000
<u>Utility - Water, Domestic</u>		
Combination Cooling Tower and Tank	1 ea. 15,000 gal. at \$8,000	\$ 8,000
AC Pipe 4", 3" & 2-1/2"	1,500 LF at \$3.50/LF	5,250
Galv. Iron Pipe, 2" and smaller	200 LF at \$2/LF	400
Hose Bibbs	15 ea. at \$50	750
		<u>14,400</u>
		\$ 14,400
<u>Utility - Electric</u>		
Low Voltage Line, Underground	3,000 LF at \$3/LF	\$ 9,000
Pull Boxes	20 ea. at \$35	700
Transformers - Dry Type	6 ea. at \$300	1,800
Area Lighting	LS	2,500
Misc. Controllers & Safety Switches	LS	<u>1,250</u>
		\$ 15,250
<u>Roads - All</u>		
Clear and Grub	9.7 Acres at \$1,000/Acre	\$ 9,700
Grade and Shape	22,740 CY at \$1.25/CY	28,425
Aggregate Base	11,400 Tons at \$5/Ton	57,000
AC Paving	3,267 Tons at \$15/Ton	49,005
Drainage Items	LS	<u>6,800</u>
		\$150,930

Facility	:	Unit	:	Cost
<u>Parking</u>				
Clear and Grub		1.8 Acres at \$1,000/Acre		\$ 1,800
Grade and Shape		5,874 CY at \$1.25/CY		7,342
Aggregate Base		2,508 Tons at \$5/Ton		12,540
AC Paving		891 Tons at \$15/Ton		<u>13,365</u>
				\$ 35,047
<u>Landscaping</u>				
Turf Development		435,600 SF at \$0.06/SF		\$ 26,160
<u>Camping and Picnicking</u>				
Camp Units		110 ea. at \$250		\$ 27,500
Picnic Units		110 ea. at \$225		22,500
Group Picnic		2 ea. at \$3,000		<u>6,000</u>
				\$ 56,000
<u>Sanitary Facilities</u>				
Combination Building #300		2 ea. at \$19,000		\$ 38,000
Comfort Station #300		2 ea. at \$12,500		25,000
Comfort Station #600		1 ea. at \$17,000		<u>17,000</u>
				\$ 70,000
<u>Signs</u>				
		LS		\$ 5,000
			Subtotal	\$402,787
			Contingencies 10%	<u>40,278</u>
				\$443,065
			Escalation 15%	<u>66,459</u>
				\$509,524
			Architectural and Engineering 20%	<u>101,904</u>
			TOTAL THIRD DECADE DEVELOPMENT	\$611,428

A P P E N D I X B
(to Addendum B)

A Fish and Wildlife Development Plan for
Kettleman City Aquatic Recreation Area

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME
WATER PROJECTS BRANCH

A FISH AND WILDLIFE DEVELOPMENT PLAN
FOR KETTLEMAN CITY AQUATIC RECREATION AREA

November 1965

Hugo Fisher
Administrator
The Resources Agency

Edmund G. Brown
Governor
State of California

Walter T. Shannon
Director
Department of Fish and Game

TABLE OF CONTENTS

	<u>Page</u>
SUMMARY	1
RECOMMENDATIONS	1
INTRODUCTION	2
PROPOSED WILDLIFE AREA	3
Physical Description	3
Present Use	4
DEVELOPMENT PLAN	4
Wildlife Habitat Development	4
Special Features	5
Fishery	6
Pond Construction	6
Fish Stocking	7
Angling Use	7
Angler Facilities	8
OPERATION PLAN	9

TABLES

<u>Table Number</u>		
1	Estimated Fish and Wildlife Development Costs	10
2	Recommended Tree and Shrub Planting List Kettleman City Aquatic Recreation Area Wildlife Lands	11



A FISH AND WILDLIFE DEVELOPMENT PLAN
FOR KETTLEMAN CITY AQUATIC RECREATION AREA

By

Jack R. Beer, Wildlife Manager III

Bruce E. Eliason, Fishery Biologist III

Under Supervision of

Howard R. Leach, Game Management Supervisor

George W. McCammon, Fishery Biologist IV

Contract Services Section, Water Projects Branch
California Department of Fish and Game

November 1965

SUMMARY

This report presents a plan for development of fish and wildlife resources as a part of the recreation features at the Kettleman City Aquatic Recreation Area, South San Joaquin Division, California Aqueduct. Included are estimates of costs for development assignable to fish and wildlife. Development of these resources at this State Water Facility is necessary in order to fulfill the needs of anticipated visitors in the coming years.

Development of fish and wildlife features would be for enhancement of these resources. Enabling legislation is provided by the Davis-Dolwig Act of 1961 which appears in the Water Code, Section 11900-11925.

RECOMMENDATIONS

1. It is recommended that development of a wildlife habitat area at the Kettleman City Aquatic Recreation Area, as described in this report, be accomplished concurrent with development of recreational features at this site.

2. It is recommended that a fishery be established in the 16-acre pond as described in this report concurrent with development of the pond for other recreational purposes and that fishing access to the California Aqueduct be provided together with facilities required to accommodate fisherman using these State water facilities.

3. It is recommended that the Legislature appropriate \$66,790 from the General Fund to pay the estimated capital costs for development of fish and wildlife features.

INTRODUCTION

The west side of the San Joaquin Valley has a long history of insufficient water and absence of water-associated recreation opportunity. Construction of the California Aqueduct as a part of the State Water Project makes it possible to provide such recreational opportunity in this area for the enjoyment of both local residents and Californians statewide. The West Side Freeway (U. S. Interstate 5) will facilitate access to recreational features along the aqueduct.

Kettleman City Aquatic Recreation Area is designed to provide a well-rounded water-associated recreation opportunity to include fishing, swimming, picnicking, camping, boating, nature study and photography, and enjoyment of "open space" (Plate 1)*. Developments to fulfill the demands for all of these uses would be accomplished on about 408 acres located some five miles south of Kettleman City and adjacent to the California Aqueduct in western Kings County. Such developments would include 256 acres of wildlife habitat plantings, a 16-acre boating and fishing pond, and a 4-acre swimming pond with associated beach developments. The Department of Parks and Recreation is planning to develop camping, picnicking, boating, water supply, and sanitary facilities to provide for all these uses as part of the State Park System.

Predictions of use indicate that about 160,000 people would visit this site during the first year of operation (1969) and that it would reach total capacity (596,000 visitors annually) during the fourth decade (year 1998). Planning, development, and maintenance of high quality recreation features is imperative to satisfy the demands of these visitors.

* Bound as Plate 4 at end of report.

This development plan is the second step, following the land use and acquisition plan submitted recently, in fulfilling our obligation to these recreationists.

PROPOSED WILDLIFE AREA

Physical Description

This site is located about five miles south of Kettleman City on the western edge of San Joaquin Valley. The land contour slopes toward the northeast, with a maximum elevation range on the area of about 55', the highest being at the southern tip of the area and the lowest along the eastern boundary.

The climate is arid, with about four inches of rainfall as an annual average. Evaporation is quite high, approaching six feet per year in this locality.

Vegetative growth reflects the arid climate, and has been adversely affected by continuous overgrazing by sheep for many years. Principal shrub species on the area are allscale (Atriplex polycarpa) and buckwheat (Eriogonum spp). All of these plants occur sparsely. Annual grasses and forbs make up the major ground cover. These occur in varying density depending on moisture conditions for each year. General appearance of the land is semibarren, with allscale the principal plant providing cover for wildlife.

There are no fish present due to the lack of water and wildlife populations on the area are low. The wildlife populations include black-tailed jackrabbit (Lepus californicus), Audubon cottontail (Sylvilagus audubonii), Fisher ground squirrel (Citellus beecheyi fisheri), San Joaquin antelope squirrel (Citellus nelsoni), Kangaroo rats (Dipodomys spp.), and other smaller mammals. Coyotes (Canis latrans) occasionally traverse the

area. Bird species known to inhabit the area at present include logger-head shrike (Lanius ludovicianus), lark sparrow (Chondestes grammacus), and horned lark (Otocoris alpestris). Other birds using the area as a part of their larger habitat include raven (Corvus corax), crow (Corvus brachyrhynchos), red-tailed hawk (Buteo borealis), Marsh hawk (Circus hudsonius), mourning dove (Zenaidura macroura), and others.

Reptile species of interest on this area include the San Joaquin leopard lizard (Gambelia wislizenii), Western ground lizard (Uta stansburiana), and one or more species of horned lizards (Phrynosoma).

Wildlife population estimates on the area based upon censusing conducted by Department of Fish and Game personnel in 1963 showed one jackrabbit per thirty acres, one cottontail per forty acres, and one antelope ground squirrel per two acres. No other wildlife population estimates are available.

Present Use

Sheep grazing in spring and early summer months is the principal use of these lands at present. Most of the acreage is unfenced and public access is unrestricted for such activities as wildflower observation, photography, and enjoyment of open space. The flat terrain makes the area unsuitable for target shooting or "plinking" with firearms. Very little recreational use of the area occurs under present conditions.

DEVELOPMENT PLAN

Wildlife Habitat Development

Approximately 180 acres of wildlife lands south of the swimming pond (Plate 1)* would be developed using water supplied through a

* Bound as Plate 4 at end of report.

pipeline which would parallel the aqueduct right-of-way. Valves to provide for control of water to properly irrigate this wildlife area would be spaced at 200-foot intervals along the pipeline. Water released through these valves would provide almost complete irrigation coverage to the area, resulting in optimum wildlife and habitat maintenance.

Water would be distributed over the area from the main irrigation valves either by shallow contour ditches or by means of earthfill checks in natural water courses. The actual method of irrigation can be determined and/or modified as experience with percolation rates, soil stability, and other factors on the area make appropriate. A list of trees and shrubs recommended for planting on wildlife lands is included as Table 2 of this report.

Special Features. A gallinaceous guzzler (wildlife watering device) would be installed in Section 21 near the midpoint in the wildlife area (Plate 1)*. This guzzler would be valuable as a public information exhibit as well as providing water for wildlife during periods when irrigation water is not available. A sign explaining the purpose of the guzzler and its operating principle would be placed close to the installation as part of the visitor interpretive service.

A "nature trail" would be constructed in a loop routing through the wildlife area, starting and ending at one of the parking lots as indicated on Plate 1*. This trail would afford visitors to the Kettleman City Aquatic Recreation Area an opportunity to acquaint themselves with the wildlife habitat of the area and to observe those wildlife species present on the site. Nature photography, birdwatching,

* Bound as Plate 4 at end of report.

and other esthetic uses of wildlife on the area would enhance the overall recreation experience enjoyed by visitors to this site.

Lands depicted as wildlife area at the northwest corner and near the administration area (Plate 1)* would be developed without an extensive irrigation system and planted to shrub species which are locally adaptable to arid conditions. Some initial watering of these plants after seeding or root-stock planting would ensure germination and/or establishment.

Waters surplus to the needs of the recreation pools or wildlife areas could be collected in a sump near the southern tip of the area or wherever natural depressions exist and could be used for development of marshland habitat. Exterior boundaries of the entire recreation area should be fenced to control livestock grazing and lands depicted as drilling sites on Plate 1* should be included in the acreage developed as wildlife habitat until such time as they are needed for other uses. In order to present the appearance of a natural wildlife habitat it is recommended that a minimum of man-made "improvements" be erected in the wildlife area and that those works necessary to operation of the area be blended as well as possible into the overall habitat. Upon accomplishment of this development plan it is anticipated that California quail (Lophortyx californica) and ringnecked pheasant (Phasianus colchicus) would become additions to wildlife species inhabiting the area.

Fishery

Pond Construction. In order to provide as many fish as possible in the 16-acre fishing and boating pond, the following criteria

* Bound as Plate 4 at end of report.

should be incorporated into design plans:

1. The pond should be shaped to conform to approximately the shape shown on Plate 1*.

2. The shoreline should have between 1:1 and 2:1 slopes extending to at least 3 feet of depth. Such depths will be necessary to control the growth of rooted aquatic vegetation.

3. Twenty-five percent (4 acres) of the pond should have depths of 10 feet or more.

4. About 3,000 - 4 x 8 x 16-inch hollow concrete building blocks should be placed randomly throughout the pond area to enhance conditions for largemouth bass reproduction.

5. A gravel filter consisting of 1" to 3" gravel should be installed between the water supply outlet and the pond proper following initial filling of the pond. This filter should be constructed in such a manner as to preclude the passage of fish eggs, fry, fingerlings, and adults. Such a filter has been installed and is operating successfully on the May Pond at the Mendota Waterfowl Management Area.

Fish Stocking. In order to assure successful establishment of the fishing in this pond specific recommendations for fish stocking are:

1. About two weeks after installation of the "gravel filter" the pond should be treated with rotenone to remove all fish that entered the pond during initial filling.

2. When the pond water has detoxified, 1,600 large-mouth bass fingerlings (Micropterus salmoides) and 16,000 bluegill fingerlings (Lepomis machrochirus) should be stocked.

Angling Use. Development of the pond fishery together with the provision of angling access to the aqueduct, would provide for full utilization of the fishery potential of Kettleman City Aquatic Recreation Area. The total angling use that could thus be accommodated on this area is estimated to be 11,700 angler days per year.

* Bound as Plate 4 at end of report.

Angler Facilities. Two fish cleaning facilities should be provided at this park. One should be located between the parking lot and the boat dock on the east side of the 16-acre pond and the other should be located near the comfort station adjacent to the aqueduct angling access trail (Plate 1)*.

Installation of these fish cleaning facilities would provide a unique opportunity to increase the fishery benefits. The primary benefits of this facility, of course, would be control of wastes from cleaning, control of flies, and a less wasteful method of caring for those fish caught. In addition to these benefits, however, the fish cleaning facilities could be designed to directly increase the fish production potential of the pond and, secondarily, to increase the vigor and growth rate of the terrestrial vegetation that will be watered from the pond.

In order to accomplish the above objectives, and since the fishing and boating pond is planned for uses other than body contact water-associated recreation, it would be desirable to include in each fish cleaning facility the following general features:

1. A cleaning table with adequate water supply.
2. A commercial grade 5 h.p. garbage disposal unit.
3. A septic tank to contain only materials from the fish cleaning tables.
4. A "leach line" system of introducing the effluent from the septic tank to the 16-acre pond.
5. A screened enclosure surrounding the cleaning table to aid in control of flies.

* Bound as Plate 4 at end of report.

In addition to the installation of fish cleaning facilities to serve both the pond and the aqueduct anglers, features for ensuring angler safety should be provided along the aqueduct fishing area.

OPERATION PLAN

It is assumed that operation of the Kettleman City Aquatic Recreation Area will be under the jurisdiction of the Division of Beaches and Parks, Department of Parks and Recreation. Under this management, operation of the wildlife area by Beaches and Parks would follow a plan formulated through coordination between Beaches and Parks and Department of Fish and Game personnel at the appropriate levels. Technical assistance and the resulting plans for management of fish and wildlife would be integrated into park management.

Two general operational activities would be involved. First would be physical activities related to wildlife habitat development and maintenance. This includes planting and irrigation of trees, shrubs, and seeded areas, maintenance of trails and interpretive services, and general cleanup of litter. These activities should be conducted by State Park personnel.

Secondly would be the routine inspection of the fish and wildlife habitat developments and populations accomplished through periodic censusing and habitat evaluations. Recommendations as to appropriate management techniques required to produce an optimum situation for fish and wildlife would then follow. These activities would be performed by Fish and Game personnel. Periodic changes, additions, or deletions in the management program may be appropriate and the mechanics for facilitating such changes should be delineated between the two agencies at an early stage of project development. The following Table 1 gives the estimated fish and wildlife development costs.

T A B L E 1

ESTIMATED FISH AND WILDLIFE DEVELOPMENT COSTS

Fishery

Fish stocking	\$ 1,760
Concrete building blocks (3,000 @ \$0.19 ea. plus shipping)	\$ 615
Gravel (50 tons, 1" to 3" size @ \$5.30 per ton)	\$ 268
Fish cleaning facilities (2 @ \$7,500 ea.)	\$15,000
Initial rotenone treatment	\$ 275
Contingency (10%)	<u>\$ 1,792</u>
TOTAL	\$19,710

Wildlife

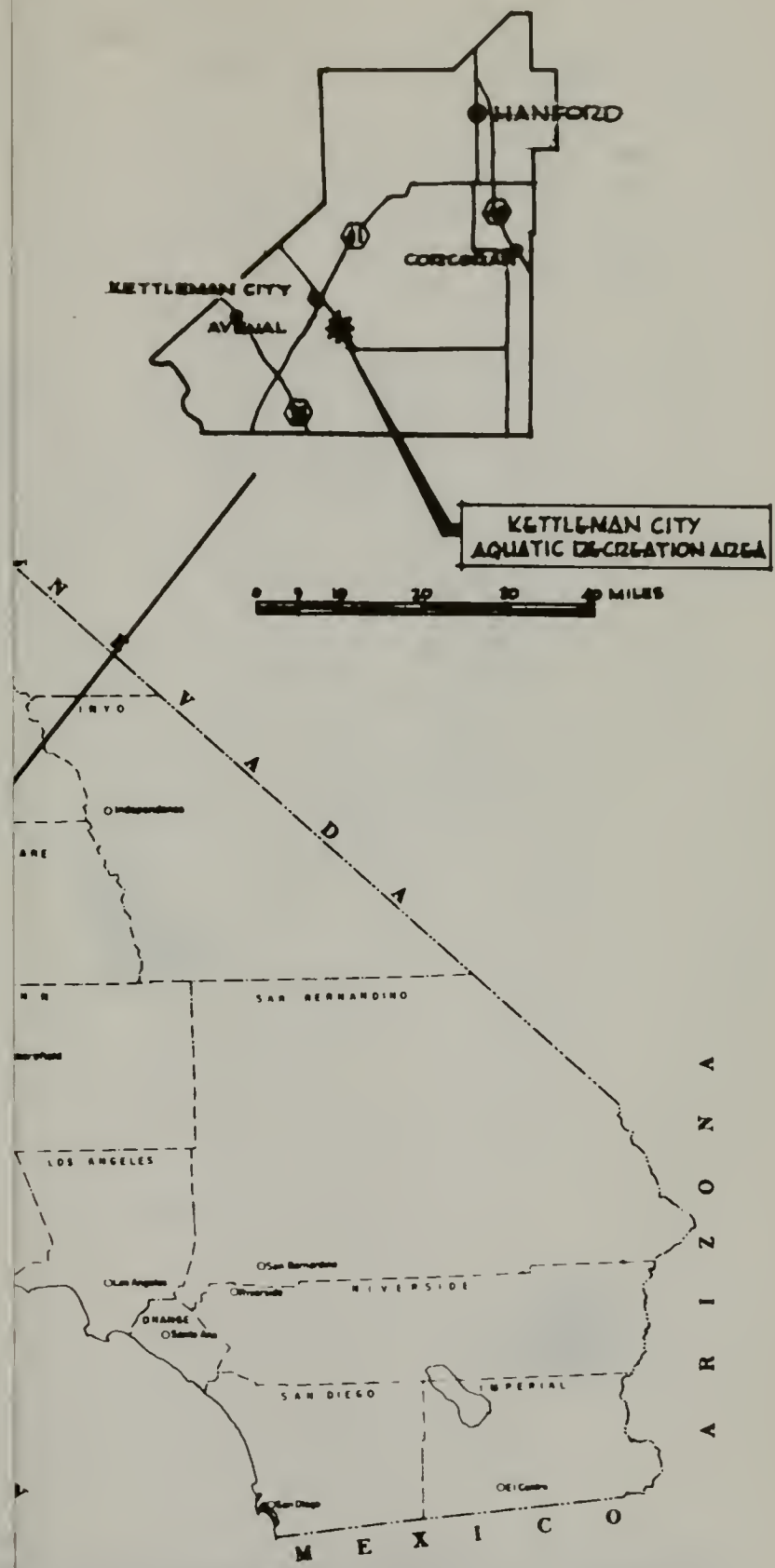
Pump (irrigation) w/controls, valves, etc.	\$ 3,000
Pipe, 18" plain conc. 3,000 LF @ \$5	\$15,000
Pipe, 12" plain conc. 2,000 LF @ \$4	\$ 8,000
Standpipes and valves 25 @ \$50	\$ 1,250
Tree plantings, 900 @ \$10	\$ 9,000
Shrub plantings, 1,200 @ 3/\$12	\$ 4,800
Seed <u>Atriplex</u> and <u>Eriogonum</u> @ .40/lb.	\$ 600
Guzzler Installation	\$ 750
Irrigation to establish plantings (20 man-days @ \$20)	\$ 400
Contingency (10%)	<u>\$ 4,280</u>
TOTAL	<u>\$47,080</u>
GRAND TOTAL	\$66,790

T A B L E 2

RECOMMENDED TREE AND SHRUB PLANTING LIST
 KETTLEMAN CITY AQUATIC RECREATION AREA
 WILDLIFE LANDS

Common name	Scientific name	Value to Wildlife
<u>Irrigated Areas</u>		
Mesquite	<u>Prosopis chilensis</u>	Food, resting, roosting
Willow	<u>Salix spp.</u>	Resting, roosting
Quail Brush	<u>Atriplex lentiformis</u>	Food, resting, roosting
Hollyleaf cherry	<u>Prunus ilicifolia</u>	Food, resting, roosting
Arizona Cypress	<u>Cupressus arizonicus</u>	Roosting
Black locust	<u>Robinia pseudoacacia</u>	Roosting, resting, nesting
Palo verde	<u>Parkinsonia microphylla</u>	Roosting, resting
<u>Dry Land Areas</u>		
Allscale (saltbush)	<u>Atriplex polycarpa</u>	Food, resting
Buckwheat	<u>Eriogonum spp.</u>	Food
Bladder-pod	<u>Isomeris arborea</u>	Food, resting
Turkey mullein	<u>Eremocarpus setigerus</u>	Food

PLATE 1



RKSN	KETTLEMAN CITY AQUATIC RECREATION AREA LOCATION MAP	DRAWING NO.
		DISTRICT

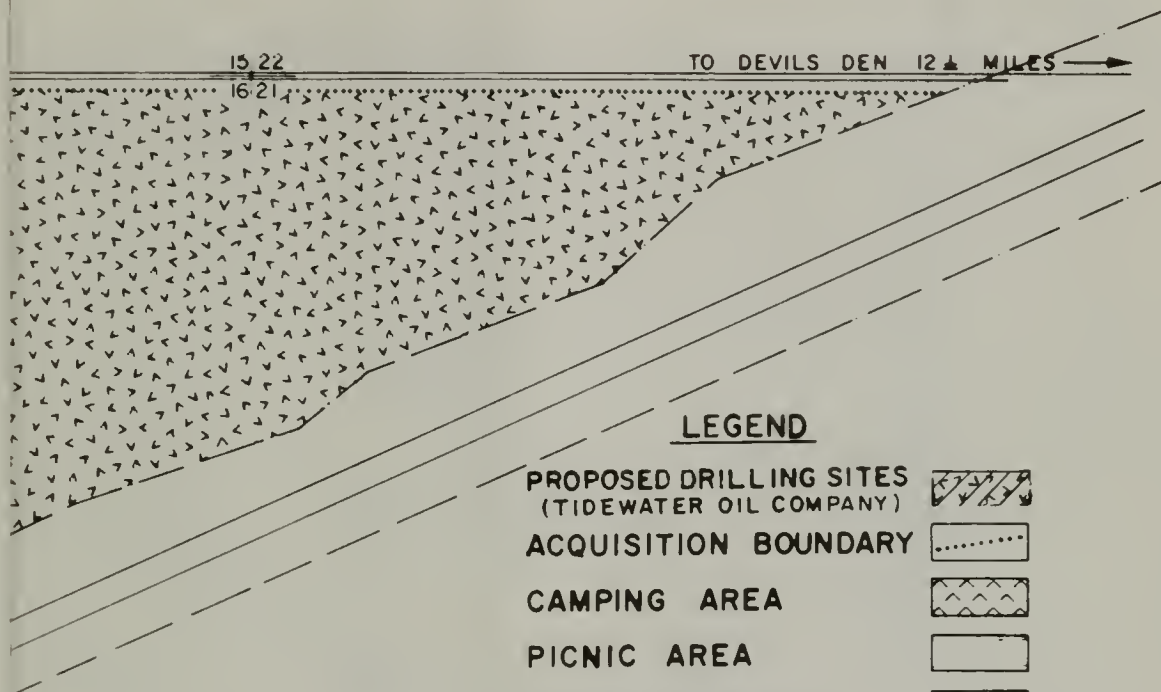


STATE OF CALIFORNIA
DIVISION OF BEACHES AND PARKS
DEPARTMENT OF PARKS AND RECREATION

KETTLEMAN CITY
AQUATIC RECREATION AREA
LOCATION MAP

DRAWING NO.

DISTRICT



LEGEND

- PROPOSED DRILLING SITES (TIDEWATER OIL COMPANY)
- ACQUISITION BOUNDARY
- CAMPING AREA
- PICNIC AREA
- WILDLIFE AREA
- CONCESSION AREA
- BEACH
- ADMINISTRATION AREA

PROPOSED ACQUISITION
408 ± ACRES

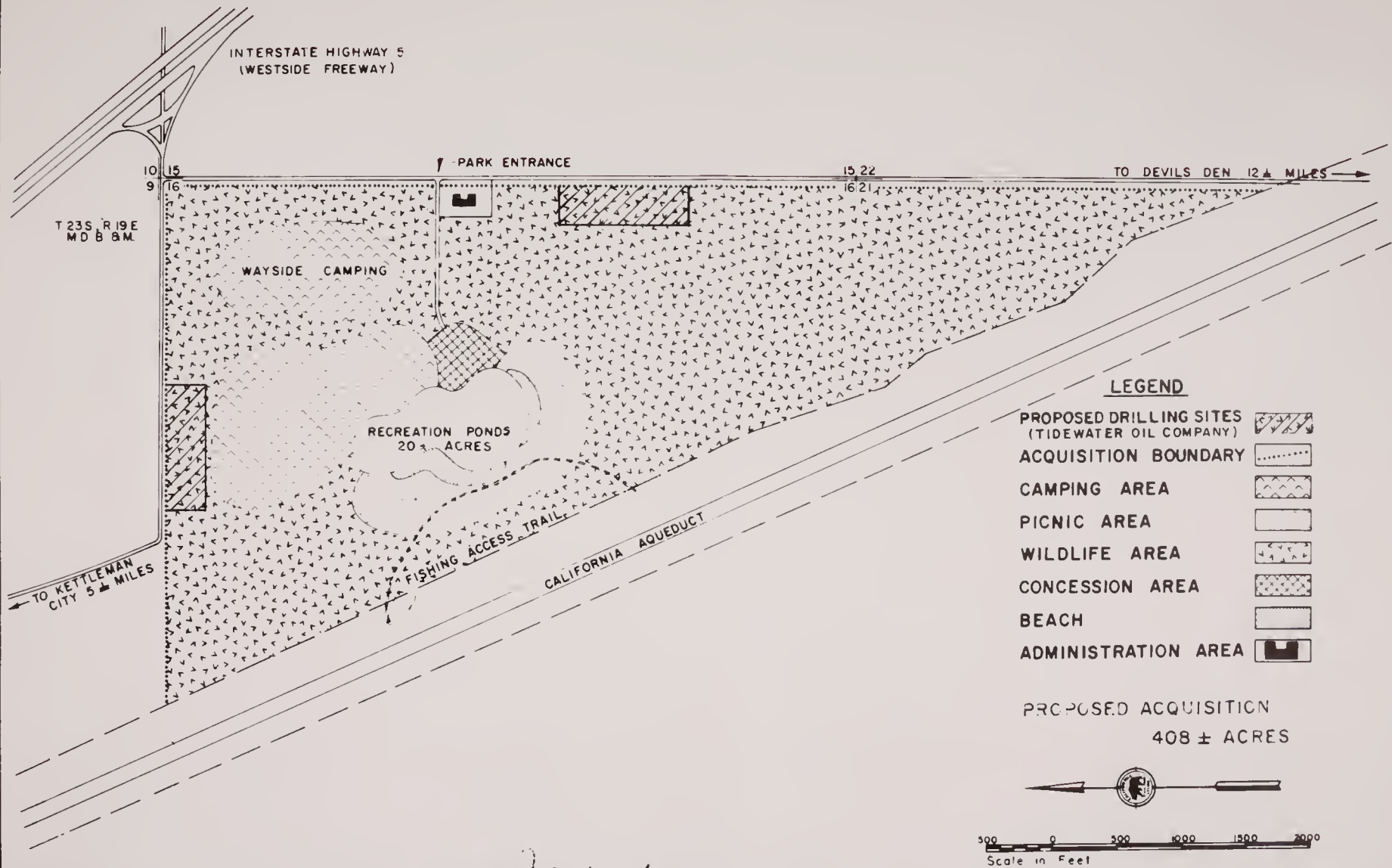


500 0 500 1000 1500 2000
Scale in Feet

DATE 6/1/65 CREATION
NIA ID PARKS
ION
DATE 6/1/65

KETTLEMAN CITY AQUATIC RECREATION AREA LAND USE AND ACQUISITION PLAN

DRAWING NO.	SHEET OF
FILE NO.	
DISTRICT	

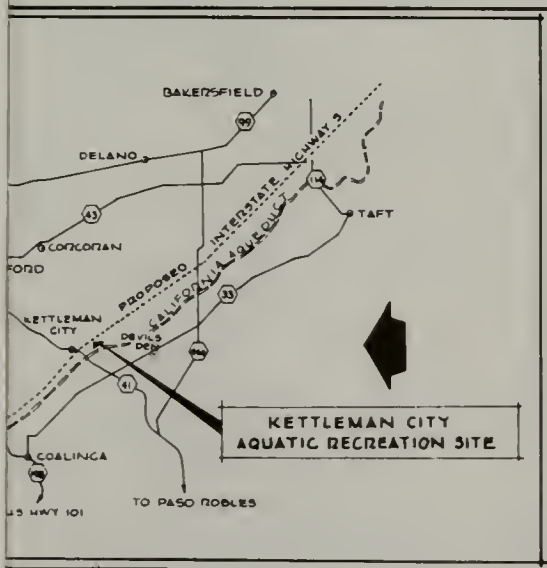
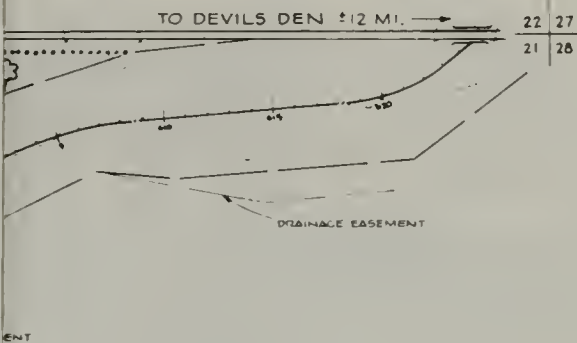


SURVEYED BY DATE		DESIGNED BY STAFF DATE		REVIEWED BY DATE		APPROVED DEP. DIRECTOR, DEPARTMENT OF PARKS AND RECREATION DATE 6/1/65	
TRACED BY DATE		DRAWN BY DEWEY DATE		REVIEWED BY DATE		THE RESOURCES AGENCY OF CALIFORNIA DIVISION OF BEACHES AND PARKS DEPARTMENT OF PARKS AND RECREATION	
CHECKED BY DATE		DATE		DATE		KETTLEMAN CITY AQUATIC RECREATION AREA LAND USE AND ACQUISITION PLAN	
						DRAWING NO. FILE NO. DISTRICT	
						SHEET OF	

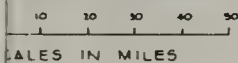


TIAL DEVELOPMENT

10 PICNIC UNITS
 10 CAMP UNITS
 1 ACRE SWIMMING BEACH
 185 CAR PARKING
 5 CAR AND TRAILER PARKING
 TREE AND TURF PLANTINGS
 SANITARY FACILITIES
 ADMINISTRATION AND RESIDENTIAL BLDGS.
 ENTRANCE STATION
 FISH CLEANING FACILITIES



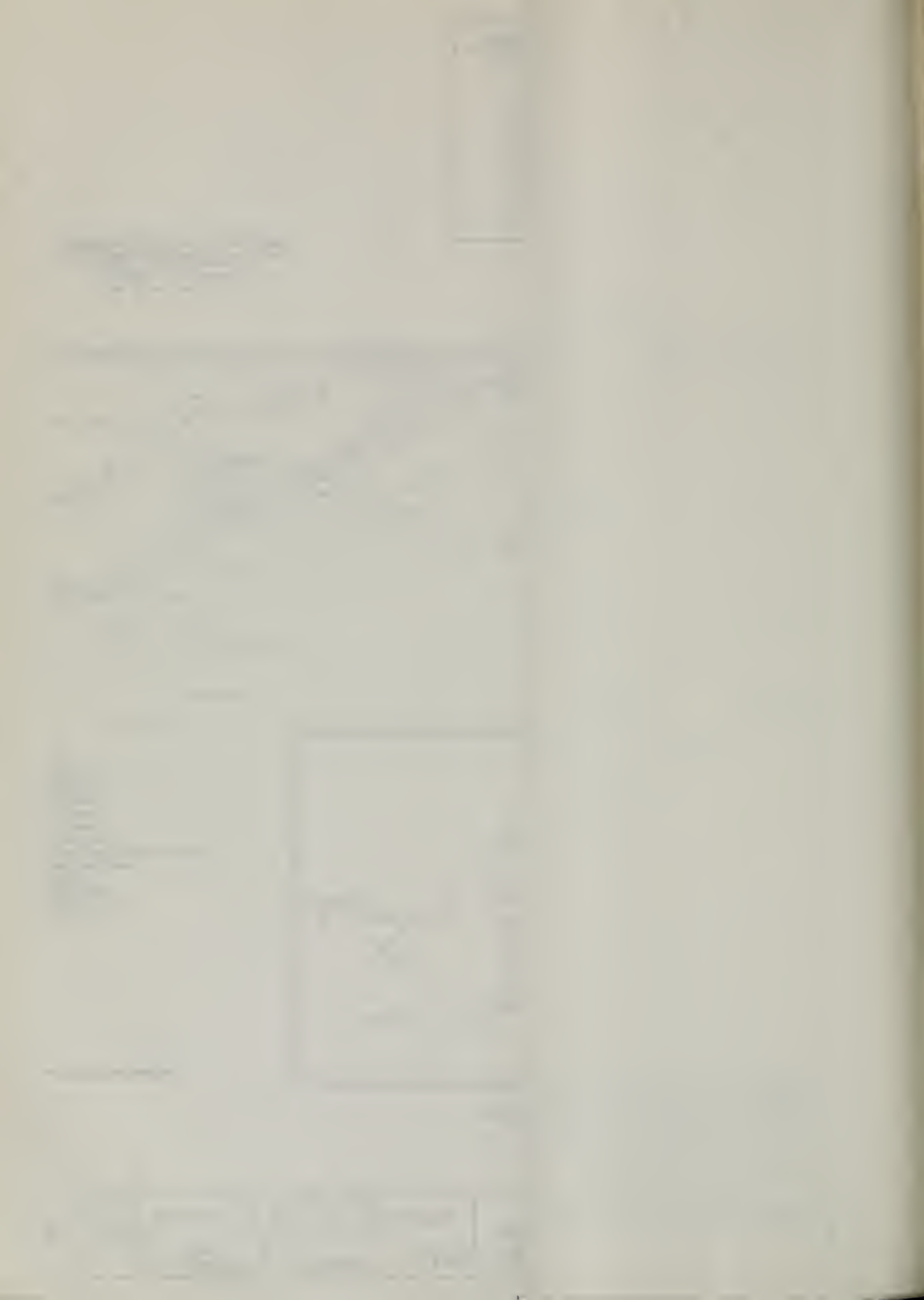
LOCATION MAP

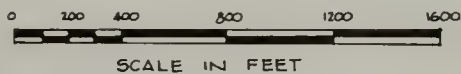
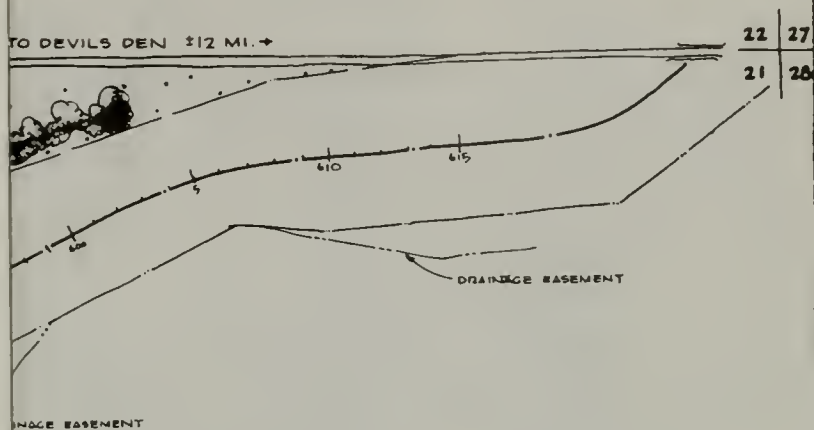


KETTLEMAN CITY
 AQUATIC RECREATION AREA
 DEVELOPED AREA PLAN



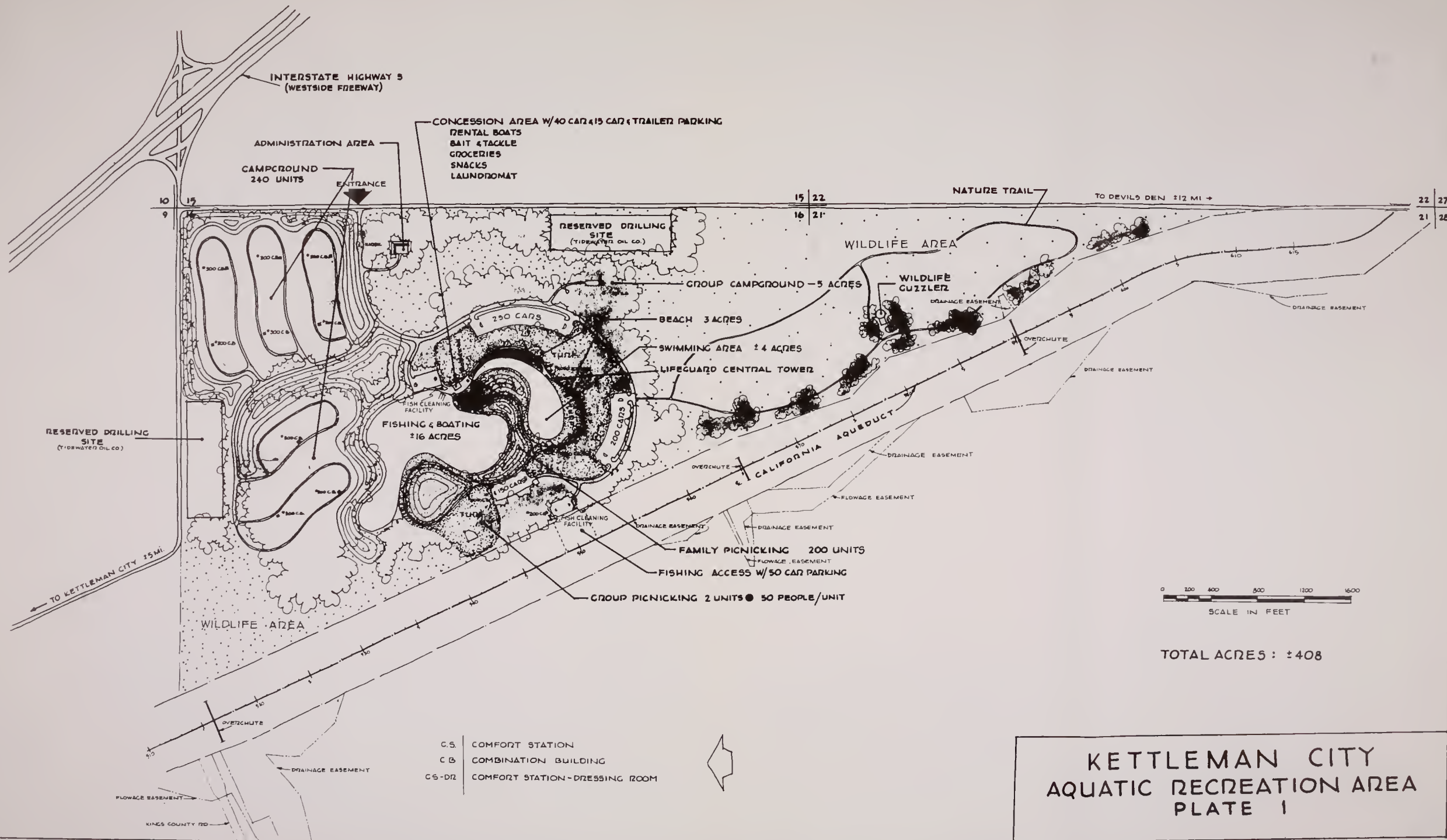
KETTLEMAN CITY
AQUATIC RECREATION AREA
DEVELOPED AREA PLAN





TOTAL ACRES : ±408

KETTLEMAN CITY
IATRIC RECREATION AREA
PLATE 1



C.S.	COMFORT STATION
C.B.	COMBINATION BUILDING
CS-DR	COMFORT STATION-DRESSING ROOM

KETTLEMAN CITY AQUATIC RECREATION AREA PLATE 1





THIS BOOK IS DUE ON THE LAST DATE
STAMPED BELOW

RENEWED BOOKS ARE SUBJECT TO IMMEDIATE
RECALL

MAR 10 1977

MAR 3 1977

FEB 23 1977

FEB 23 1988

MAR 23 1988

APR 03 1988

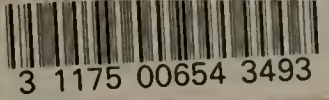
RECEIVED

MAR 21 1988

PHYS SCI LIBRARY

LIBRARY, UNIVERSITY OF CALIFORNIA, DAVIS

Book Slip-25m-6,'66 (G3855s4) 458



No 479886

California. Dept.
of Water Resources.
Bulletin.

TC821,
C2
A2
no.117:19



PHYSICAL
SCIENCES
LIBRARY

Dec 1966

LIBRARY
UNIVERSITY OF CALIFORNIA
DAVIS



